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THE PHYSICS, MATHEMATICS, AND CHEMICAL  
COMMUNITIES IN THE UNITED STATES 1870 TO 1915:

A PRELIMINARY STATISTICAL REPORT

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How many people published research in physics, mathematics, and chemistry in the United States between the Civil War and World War I? What fraction of the publishers earned Ph.D.'s and what fraction did not? Where did they take their doctorates? Where were they employed? What were their rates of publication? Who were the more productive members of each community? How did they differ from the larger body of publishers in the discipline at large? Who led the professional societies founded in each discipline? How did these organizational leaders compare with the productive people in the field?

Scholars of American physics and chemistry have estimated some of these data, but none has provided a comprehensive, statistical portrait of the two disciplines for the period between the Civil War and World War I. American mathematicians remain completely unstudied. Of course, statistical information scarcely tells the whole story in the history of science, and it reveals very little about intellectual progress. But such data seem essential for a comparative study of the American physics, mathematics, and chemistry communities. This data has thus been compiled as a first step in a broader study of the American physics, chemical, and mathematical communities. I have summarized the raw data in the attached Appendices I through XVI and presented the data for analysis in Tables 1 through 15. The discussion and analysis which follows

is preliminary. The final version will seek to analyze and interpret the statistical results and, to this end, will incorporate material drawn from such other important sources as professional addresses, articles, biographies, and secondary studies.

### Procedure

I divided the subject chronologically into two periods separated in the 1890s, when two of the professional societies were founded and the third was significantly reorganized; when the three communities also started to expand at a rapid rate. The specific dividing point for physics was 1893, the inaugural year of the Physical Review. For mathematics it was 1890, about the time that the New York Mathematical Society became the American Mathematical Society. For chemistry, the year of division was 1892, when the American Chemical Society was reorganized into a genuinely national body. For the opening dates of the first period, I chose, in mathematics 1878, when the American Journal of Mathematics was launched; in chemistry, 1879, which marked the first publication of the American Chemical Journal and of the Journal of the American Chemical Society. The first period for both chemistry and mathematics is twelve years long; the second, twenty-four. In physics the first and second periods are both twenty-four years long. In all, with appropriate adjustments for the anomaly of the first physics period, the data lend

themselves to relatively easy comparative analysis.

Defining a practitioner of the discipline as a publisher, I sought to compile a list of everyone who published at least one article in physics, mathematics, or chemistry in what were assumedly the leading American journals in these fields for the appropriate period. In the first period, for physics, the search covered the American Journal of Science, 1870-1893. Virtually no mathematical research appeared in the Journal; indeed, it was said that virtually none was done in the United States before the 1870s. Hence, for mathematics, the search covered the American Journal of Mathematics and the Annals of Mathematics (1884). For chemistry in the first period, the search covered the Journal of the American Chemical Society and the American Chemical Journal.

In the second period, for physics, the search shifted to the Physical Review. For mathematics, the Transactions of the American Mathematical Society (1900) was added to the American Journal of Mathematics and the Annals. For chemistry in the second period, the search continued in the Journal of the American Chemical Society, omitted the American Chemical Journal, and expanded to include the Journal of Industrial and Engineering Chemistry (1909).

I suspect that the sample of journals needs to be enlarged somewhat. In the first period, the American Chemical Journal yielded a significant number of chemists who did not appear in the Journal of the American Chemical Society, so it seems necessary to extend the search

of the American Chemical Journal for the second period, through 1915. In physics, a surprisingly small number of people appear in the appendices for the second period, III and IV, who also appear in those for the first, I and II. The likely explanation is that various older physicists such as Albert A. Michelson, who does not appear in the appendices for the second period, continued to publish in the American Journal of Science even after the founding of the Physical Review.

Another problem with confining the physics group to those who published in the Physical Review is that the Review was not the chief organ for the publication of articles in the increasingly important field of atomic spectra. Physicists often published their articles on spectral research in the Astrophysical Journal, which was also founded in the United States in 1893. Hence, I intend to enlarge the search for physicists by including the American Journal of Science and the Astrophysical Review in the second period.

Still another problem is that, like Michelson, American physicists, mathematicians, and chemists may well have published a significant number of articles in foreign journals. One can conveniently discover such foreign publications by checking the Royal Society Catalogue of Scientific Papers for the period before 1900, Science Abstracts for the period afterwards, and Poggendorph's Handbooks for both. However, the task of checking those publications for every physicist, chemist, and mathematician in the appendices would be monumental, and, worse,

would not repay the investment of time. It will be worthwhile to check those references for the physicists, mathematicians, and chemists who earned positions as productive members of their disciplines by virtue of their publications in American journals. The results of that search will both round out the statistical investigation and supply important information about the degree to which the leading members of each discipline published abroad and how that degree changed from the 1870s to World War I.

#### The Raw Data and Its Organization

For each period and discipline, I classified the publishers into two groups, productive and less productive. I arbitrarily took the definition of "productive" to be the publication of at least one article every three years. Since the second periods for each discipline were about equal, inclusion in the pantheon of productive mathematicians, physicists, and chemists after the 1890s required the publication of at least eight articles. Since the earlier periods were unequal, inclusion in the productive groups prior to the 1890s required the publication of at least four articles in mathematics and chemistry and of at least seven in physics. The productive publishers are listed in the odd-numbered appendices through XI, the less productive in the even-numbered, through XII. These appendices list everyone who was found to have published an article, except Appendix XII, which is a sample. The total number of less productive chemists represented in Appendix XII

amounted to about 2100, which was far too large to handle given the available time and resources. The sample presented in Appendix XII was drawn simply by selecting every eighth name in the group.

For every publisher, I tried to learn if, when, and where he or she received a Ph.D.; the principal places of his or her employment; whether he or she had studied abroad; and whether the principal discipline differed from the discipline under study. The main sources for this information were the three editions of American Men of Science from 1906 to 1921, the Dictionary of American Biography, and the National Cyclopedia of American Biography. These sources yielded the necessary information for a large majority of the physicists and mathematicians but not for the chemists, especially in the second period. Possibly many of these missing chemists were in industrial corporations or business firms and I hope to find more of them by consulting appropriate supplementary directories.

In the appendices, the principal field of the publisher if different from the discipline is noted by the following abbreviations: A, astronomy; AG, agriculture; C, chemistry; G, geology; GD, geodesy; EN, engineering; ETH, ethnology; M, mathematics; ME, meteorology; MED, medicine; MI, mineralogy; P, physics; Z, zoology. The asterisks directly to the left of the names denote women. An entry under "Foreign Study" means that the person took his or her doctorate in Europe, or studied there as a pre- or post-doctoral student; or was born and substantially educated

there. The principal place or places of employment is for the years after the receipt, or after the average age of receipt, of the doctorate and of course applies only to the period covered by the particular appendix. For publishers who were not found in one of the main sources, the principal place of employment has been identified by the institutional affiliation which often appeared along with the articles. The cross-listing column is self-explanatory, except that there are no entries for chemists only because the cross-list check has not yet been made.

A rough assessment was made of whether the articles were "pure" or "applied" research. The working definition for "pure" was that the research was addressed to a problem intellectually internal to the discipline. For "applied," the criterion was that the research sought to answer a type of technological or industrially relevant question. In the case of physics and mathematics, the vast majority of articles fell in the "pure" category, but in chemistry the articles were more widely distributed among "pure," "applied," and medical research. This distribution is recorded in the chemistry appendices in the columns headed P, A, and M. In all the appendices, the numbers in parentheses next to the figures in the column for total articles denote the year or years in which the articles were published, but I have not completed this tabulation for all the disciplines. The Productivity Rate is simply the yearly average of articles published per person. For people who entered the profession after the beginning of a given period, the

computation was made on the basis of the years since the person received the doctorate or reached 28, which was the average doctoral age for the three disciplines. In cases where computations were made for publishers with no doctoral or age information, the base was the entire period.

Practitioners of the three disciplines who entered upon research after the beginning of the period might well of course have produced at the rate of one article every three years but not have achieved the total required for inclusion in the productive group in their discipline. It seemed important to identify these higher producers, but the task was not straightforward. A productivity rate of 0.33 would nominally place someone in the productive category, but a publisher could achieve even a far higher rate if in the last two years of the period he happened to publish one or two articles and also happened to be awarded his Ph.D. about the same time. To call such people productive would be spurious, since many of our mathematicians, chemists, and physicists published no more than one or two articles. To qualify as a High Producer, our scientists and mathematicians had to satisfy at least one of two criteria: first, they had to achieve an appropriate minimum productivity rate for at least six years; second, if the minimum rate was achieved in less than six years, they had to have published more than an appropriate minimum number of articles (in the cases of physics, mathematics, and chemistry in the later period, at least three; in the case of physics in the earlier period, at least three; in the case of chemistry and

mathematics in the earlier periods, at least two). The High Producers are designated in the appendices by double asterisks after their Productivity Rates.

To assess the leadership of the professional societies in physics, mathematics, and chemistry, I constructed appendices XIII through XVI. Appendices XIII and XIV list respectively the people who held any office, including council memberships, in the American Mathematical Society from 1888, when the society originated as the New York Mathematical Society, to 1915; and in the American Physical Society, from its founding in 1899 to 1915. Appendices XV and XVI list respectively the officers in the American Chemical Society, first from its founding in 1876 to the reorganization in 1891; then, from 1892 to 1915. There were officers in each society who did not show up on the productivity appendices I through XII. If their biographical data could be found, it was listed, but I have no productivity rates for most of these people. Some officers in the Chemical Society failed to show up on the productivity appendices only because they were omitted from tabulation by virtue of the random sample nature of Appendix XII. Officers in the Chemical Society who appeared in the overall group of less productive chemists were entered in the appropriate appendix.

#### The Results: A Discussion

The results are tabulated in the attached Tables 1 through 15. The tabulations in Tables 14 and 15 are divided at 1897 because we have

had available doctoral statistics by field and school in the United States for the years since 1898 but heretofore have had only gross figures for the years before then.

#### A. First Period

In the first period, 217 people published articles in physics, but 74 were in different principal fields. Hence, there were about 143 publishing physicists. Of the total group of publishers, 31 fell in the productive and 186 in the less productive categories. Together they published 819 articles, but the 31 productive physicists, who represented only 14.3 percent of the total publishers in the discipline, accounted for 56.9 percent of all the articles. While approximately one-third of both groups consisted of people in different principal fields, the two groups differed in their professional training and preparation. About one of every three productive physicists took Ph.D. 's and studied abroad, compared respectively to about one out of four and one out of six of the less productive publishers. In the United States, Hopkins, Yale, and Harvard, in that order, were the chief producers of doctorates, turning out 81 percent of the domestic Ph.D. 's in the field.

Yale and Harvard accounted for 32 percent of the total employment positions of the productive physicists. (Note that a "position" is not a "practitioner." If a person held a job for five years at Harvard and seven at Yale, his employment record was entered as one position for Harvard and one for Yale.) Otherwise, in the academic world both the

productive and less productive physicists were fairly evenly distributed; the productive positions spread over at least ten institutions, the less productive over at least thirteen. In both groups, one out of six positions was in a federal agency but only a very small fraction in business and industry. In both groups about one out of nine positions was independent.

In mathematics in the first period, 82 people published articles. Since 13 of them were in different principal fields, there were 69 publishing mathematicians, about half as many as the publishing physicists. Of the total mathematical publishers, 21 fell in the productive category and 61 in the less productive. Together they published 232 articles, but the productive mathematicians, representing only 25.6 percent of the publishers in the discipline, accounted for 61.2 percent of the articles. About two out of five members of both groups held Ph.D.'s and one out of five studied abroad. But the less productive groups included 8 high producers, 7 of whom held Ph.D.'s and 6 of whom studied abroad. If they are figured into the productive group, then 53.6 percent of the productive group earned the doctorate and 35.7 percent studied abroad, compared respectively to 31.5 percent and 13.0 percent of the less productive.

Hopkins accounted for over 40 percent of the domestic doctorates in mathematics, Yale, Princeton, and Cornell for another 35 percent. Unlike the productive physicists, the productive mathematicians were somewhat more concentrated, occupying positions in only 7 schools;

Hopkins had 32 percent of the total, while the 6 others had only 4 percent each. In the less productive group, the positions were distributed more widely over at least 20 institutions, none of which had more than 3 percent, except Hopkins (14 percent) and Cornell (6 percent). A significant fraction of the positions in both groups, 18 percent and 14 percent, fell in the federal government.

In chemistry in the first period, 327 people, more than the publishers in mathematics and physics combined, published articles. The principal field of virtually all of the chemical publishers was chemistry. There were 66 productive and 261 less productive chemists. Together they published 1085 articles, but the productive group, which represented only 20.2 percent of the total publishers, put out 65.6 percent of the articles. The two groups differed sharply in essential characteristics. While almost half the productive chemists earned doctorates and studied abroad, only about one out of five of the less productive took the Ph.D. and only one out of seven studied abroad. Four schools -- Hopkins, Harvard, Columbia, and Yale -- produced 77 percent of the domestic productive doctorates. Except for Hopkins, which produced almost half the doctorates in the less productive group, the domestic Ph.D.'s for this category were taken approximately evenly at ten other schools.

The employment positions of the productive chemists were spread very widely -- to twice the degree of those for productive physicists -- over at least 28 institutions; with Harvard commanding 9 percent

of the positions, Yale 6 percent, Hopkins 5 percent, and each of the rest 3 percent or less. For the less productive chemists, the distribution was about the same. In both groups, about one out of ten positions was in an agricultural college, agricultural experiment station, or medical institution. For the productive chemists, another one out of ten was in a federal, state, or local agency, for the less productive, one out of seven. Only a small fraction of the positions, 9 percent for the productive group and 6 percent for the less productive, was in business and industry.

Unlike the physicists and mathematicians, both the productive and less productive chemists devoted about one out of every four articles to applied research, about one out of eleven in biological subjects. Virtually all the articles for physicists and mathematicians fell in the pure research category. The applied subjects for chemists were notably agriculture, water quality, and industrial products and processes.

The productive physicists and mathematicians earned their doctorates on the average at 25.7 and 26.1 years of age, compared to 28.4 and 27.4 for the less productive. Surprisingly, virtually no difference marked the average doctoral age for productive and less productive chemists. More productive chemists (48.5 percent) took Ph.D.'s than productive physicists (32.2 percent) or productive mathematicians (38.1 percent). Productive chemists also took many more of their Ph.D.'s in Europe and studied abroad.

#### B. The Second Period

In the second period, at least 513 people published physics articles, 81 of them in different principal fields, leaving 432 nominal physicists. There were 33 productive and 480 less productive physics publishers. The increase of only two in the productive group over the previous period may be the result of my having ignored the American Journal of Science after 1893. Considering the lack of cross-listings between physicists of the two periods, one may conclude that the Physical Review was clearly the journal of the younger generation. For the productive physicists, the fraction in different principal fields dropped from 10 percent to 3 percent, for the less productive, from 34 percent to about 17 percent, from the previous period.

In any case, together the two groups of physics publishers produced 1265 articles, but the 33 productive physicists, who represented only 6.4 percent of the practitioners, produced 31.5 percent of the publications. Nine out of ten productive physicists earned Ph.D.'s, a threefold increase over the previous period, but only two out of three of the less productive. Twice the fraction of productive as of non-productive Ph.D.'s took their doctorates abroad, and three times the fraction studied abroad. A larger fraction of these productive physicists also studied abroad than did their predecessors. Cornell produced 21 percent of all the domestic physics doctorates taken by both groups; Chicago, Columbia, Harvard, Hopkins, and Princeton were responsible



for another 48 percent. In short, 6 schools produced 69 percent of the domestic doctorates, compared to 3 accounting for 81 percent in the previous period. At least 21 schools produced doctorates in physics, which was a substantial enlargement from the group in the previous period. For the productive group of physicists, Cornell and Harvard alone produced 72 percent of the doctorates, and Columbia produced another 10 percent. To a significant degree, the Physical Review may have been an outlet for Cornell graduates.

The positions of the productive physicists were spread rather evenly over at least 22 institutions, compared to over at least 10 in the previous period. The spread for the less productive physicists was 52 institutions, compared to 13. There were many fewer positions for productive physicists in federal agencies, but about one out of eleven positions occupied by the less productive physicists was in a federal agency and one out of eight in business and industry.

In mathematics in the second period, 338 people, only 14 of them in different principal fields, published articles. Mathematics, in short, was growing even more specialized than physics. There were 41 productive mathematicians, almost a twofold increase over the previous period and 297 less productive mathematicians, almost a fivefold increase. Together the two groups published 1263 articles, but the 41 productive mathematicians, representing only 12.1 percent of the discipline, produced about 50 percent of the articles. Nine out of ten

of the productive mathematicians held Ph.D.'s, almost three times as large a fraction as their productive predecessors and about 1.25 times as large as their less productive contemporaries. Compared to the earlier productive mathematicians, almost four times greater a fraction of the Ph.D.'s in this later productive group earned doctorates abroad and 3.5 as large a fraction of the total group studied abroad. Compared to the contemporary less productive group, the ratios were 4.5 and 3.5

Chicago produced 24 percent of the domestic mathematics doctorates, Clark, Cornell, Harvard, Hopkins, and Yale another 52 percent. While four schools produced 75 percent in the earlier period, six schools produced 76 percent of the domestic doctorates taken by members of the later group. Hopkins' share of doctoral production declined substantially, with Chicago taking up the slack. The total number of institutions producing mathematics doctorates in the United States was 14, a substantial increase. One out of three of the productive doctorates was earned at Chicago, one out of seven at Hopkins; together the two schools produced about half the productive mathematicians with domestic Ph.D.'s. In employment, the positions of the productive mathematicians were much less concentrated than in the earlier period, when they appeared in 7 schools; now they were spread through at least 23. Chicago, Harvard, Hopkins, Penn, and Princeton accounted for 43 percent of all productive academic positions. Members of the less productive group held positions in at least 55 institutions, with no major concentrations,

compared to at least 20 in the previous period. Unlike the previous period, hardly any of the positions held in either group were in federal agencies; the fraction in business and industry also declined.

In chemistry in the second period, 2147 people, virtually none of them in different principal fields, published articles in chemistry. There were 99 productive chemists, a 50 percent increase from the first period; 2048 less productive chemists, almost an eightfold increase over the first period. Together the two groups published 5288 articles. The productive chemists, representing a scant 4.88 percent of the discipline, accounted for 40 percent of the publications. Two out of three of the productive chemists had Ph.D.'s and two out of five studied abroad. About 1.5 as large a fraction of productive chemists held Ph.D.'s as their productive predecessors, about 2.5 as large a fraction did so as their less productive contemporaries. A smaller fraction of the productive Ph.D.'s held foreign doctorates than their productive predecessors, but three times as large a fraction held foreign doctorates as did their less productive contemporaries. A smaller fraction of the productive chemists also studied abroad, but, compared to their less productive contemporaries, 4.5 times as large a fraction went to Europe to learn.

Six schools -- Columbia, Cornell, Harvard, Penn, and Yale -- produced, in about equal parts, 73 percent of the domestic doctorates, compared to only 4 schools accounting for 72 percent in the previous

period. The number of schools producing at least 20 percent of the domestic doctorates increased by over 50 percent, from 14 to 19. In the productive group, only 4 schools produced 53 percent of the doctorates, but the number of schools producing at least 3 percent of the doctorates in the productive group rose to 13. The employment positions of both the productive and less productive chemists were even more widely distributed than for the previous period. In the productive group about one out of twelve and in the less productive groups about one out of sixteen positions was in an agricultural experiment station. One out of six productive chemical positions was in a federal agency, including one out of nine in the U. S. Department of Agriculture, a substantial increase over the one out of twenty in the previous period. Bespeaking little change from the previous period, only 8 percent of the productive chemical positions were in business and industry. But bespeaking a major and significant change, now almost one out of five of the less productive positions was in business and industry, compared to one out of sixteen in the previous period.

The productive chemists still published mainly pure research, but the proportion of their total output in this category fell from 66.9 percent in the previous period to 58.5 percent. In a striking reversal of emphasis from the previous period, over half the articles published by the less productive chemists fell in the applied category, which probably expresses in part the increasing fraction of such chemists

employed in industry.

Overall, the average age for the receipt of the doctorate rose in physics by 3.1 years, in chemistry by 0.8 years. For productive mathematicians the average doctoral age remained the same. The average age for the Ph.D. for all practitioners rose by 3.5 years in physics, 1.3 years in chemistry, and 2.1 years for mathematicians.

While productive mathematicians and physicists were almost all Ph.D. 's, only 65 percent of productive chemists held the doctorate. Chemists were also much less likely to go abroad than mathematicians or physicists.

#### C. The Professional Society Officers

In the first period, officers in the American Chemical Society held the doctorate with somewhat greater frequency but studied abroad with somewhat less frequency than their productive peers. On the average, their productivity rate was about 30 percent lower, though still comfortably high enough for the productive group. However, only 57 percent of the officers were high producers and only 65 percent published anything in the journals surveyed. The employment positions were spread over 41 institutions, with relatively low concentrations of positions per institution (1.22); none of the institutions had four or more of the officers' employment positions. Interestingly, while about six out of seven of the productive positions were in academic institutions, only one out of two ACS officers' positions was in a college or university.

Over twice the fraction of ACS officers' positions, as compared to productive chemists, was in business and industry.

In the second period, the American Chemical Society officers held the doctorate, took foreign Ph.D. 's, and studied abroad with somewhat greater frequency than their productive peers. But their average productivity rate dropped from the previous period, falling to about 60 percent lower than the average for the contemporary productive group. Only half the ACS officers qualified as high producers, though the fraction who were publishers rose to almost three-quarters. Like the profession at large, the ACS officers were employed in a very large number, 123, of institutions, but there was now a certain degree of concentration. The ratio of ACS officers' positions to institutions climbed from 1.22 to 1.55 and one-quarter of the officers' positions were confined to only 11 institutions. A slightly higher proportion of ACS officers' employment positions were in the academic world. But the academic fraction was still significantly lower and the industrial fraction still significantly higher than the comparable fractions for the productive group.

A smaller fraction of American Mathematical Society officers than of productive mathematicians held Ph.D. 's, took their doctorates in Europe, or studied abroad. On the average, the productivity rate of AMS officers was only half that of their productive peers; only 60 percent were high producers, only 72.5 percent publishers. In terms of employment positions, the AMS officers were much more concentrated

than ACS officers. The ratio of positions to institutions was 2.52, and 56.4 percent of the employment positions were at only 10 institutions. Like the productive mathematicians, the leadership of the AMS was 95 percent academic.

A higher fraction of American Physical Society officers than of productive physicists held Ph. D. 's and took their doctorates abroad; an approximately equal fraction studied in Europe. The average productivity rate of the APS officers was only about half that of the average rate of the productive group in the discipline. Slightly more than half the officers were high producers and seven out of eight were publishers. In employment, the ratio of positions to institutions was 1.45, which was comparable to the chemists, but the degree of concentration for the APS officers was higher; they were distributed among only 45 institutions, one of which had 10 percent of them. APS officers were overwhelmingly academics, though slightly less so than their productive peers. About 135 of their employment positions were in federal agencies, compared to 4 percent for the productive group.

#### Summary Observations

1. In both periods and all three disciplines, a relatively small fraction of people publishing in the field produced a disproportionately large fraction of the articles. The progress in the field was determined by a productive elite.

2. All three disciplines grew substantially from the first to the second periods, but in physics an increase of more than twofold in the total number of practitioners was accompanied by almost no increase in the size of the productive group. While this may be a peculiar result of the sample journals investigated, in mathematics a fourfold increase overall was accompanied by only a twofold jump in the productive group. In chemistry more than a sixfold overall jump yielded an increase in the size of the productive group of only 1.5. One might tentatively conclude that, at least in this period, the marginal rate of increase in productive scientists and mathematicians was diminishingly small.

3. In both periods and all three fields, substantially more of the productive than of the less productive publishers earned Ph. D. 's and studied abroad.

4. From the first period to the second in all three fields, more of the productive and less productive publishers in all three fields took doctorates.

5. In both periods and all three fields, the majority of people published one or two articles, usually about the time that they earned their doctorates (or probably a master's degree), then never published again.

6. In the first period, the production of domestic doctorates in physics and mathematics was concentrated in only five centers, all of them private; in the second period, in eight centers, all of them private. In the first period, there were four centers of domestic doctoral

production in chemistry, but the Ph.D. 's who published were drawn from a broader institutional base than in physics and mathematics. In the second period, while six schools accounted for almost three-quarters of the domestic chemistry doctorates, the general Ph.D. institutional base was broader still.

7. In the first period, while productive chemists earned their doctorates in no less time than their less productive brethren, on the average the productive physicists were 2.7 years and the productive mathematicians 1.3 years quicker. In the second period, the rise in the average age for the receipt of the doctorates in all three fields suggests that standards for the degree rose, too.

8. In both periods, physicists and mathematicians found their positions of employment primarily in the academic world and, except for mathematicians in the later period, secondarily in federal agencies. In both periods neither the productive nor the less productive physicists were concentrated in a small group of academic institutions. In the first period, productive academic mathematicians were more concentrated than physicists but the less productive were not.

In both periods, both productive and less productive academic chemists were broadly distributed though the academic world, and the degree of distribution tended to increase from the first period to the second. In both periods, chemists, too, found their principal positions of employment in the academic world, but in the second period a

significantly large fraction of productive chemists were employed in federal agencies and agricultural experiment stations; of the less productive chemists, in business and industry.

9. In both periods the productive chemists published a significant fraction of applied research, even though their business and industry employment rates were comparably as low as physicists and mathematicians. In the first period, more productive chemists took Ph.D. 's and studied abroad than physicists and mathematicians. Whatever the ideal of pure research in the German and American university, there was clearly considerable interest in applied research and a demand for information in the areas of agriculture, water supply, and industrial products and processes. In the second period, employment opportunities seem to have played a larger role in shaping the type of research done, particularly in making the less productive chemists more interested in applied rather than in pure research. Whatever the reason, the chemical community was much more closely linked with nonacademic institutions and activities than were the communities of mathematicians and physicists.

10. In the first period, the high proportion of physics publishers who were Yale doctorates and of the mathematics and chemistry publishers who earned their Ph.D. 's at Hopkins suggests that the American Journal of Science, the American Mathematical Journal, and the American Chemical Journal were in significant part outlets for locally trained talent. The same might be said of the Physical Review in the

second period.

11. The production rate of Ph.D.'s in physics, mathematics, and chemistry for American universities in the thirty years from 1867 to 1897 was very low, approximately two or three per year in each discipline for the entire academic community. In that period, about two-thirds of physics and mathematics doctors, and about half of the chemical, took their Ph.D.'s in the United States.

12. Given the lower percentage of productive chemists who had Ph.D.'s in the second period compared to physicists and mathematicians, one is tempted to suppose that perhaps the chemists had a more diverse system of access to careers in research than physicists and mathematicians. Also, given the significantly higher productive rates of productive chemists as compared to productive physicists and mathematicians, one would suspect that the chemists may also have had a different system for the organization and conduct of research.

13. In the final tabulation, the High Producers should probably be removed from the less productive lists and incorporated into the calculations for the productive groups.

14. All three professional societies seem to have been founded and their officer corps dominated in the early years by two groups of practitioners: first, a professionally oriented group of productive researchers; second, a much less productive group who probably came from the geographical locale of the society's headquarters.

After 1892, the fall in productivity of the American Chemical Society officers probably bespeaks the extent to which, as a result of the reorganization, the officers included councilors from the local societies. From the beginning, the ACS officer corps included a significant industrial and business faction. In the American Mathematical Society, the research oriented group among the officers was more of a concentrated academic elite than the officers in the Physical Society, who in turn were more that way than the chemists but considerably less so than the mathematicians.

PRODUCTIVE PHYSICISTS, MATHEMATICIANS, AND CHEMISTS

TABLE 1  
FIRST PERIOD

|  | Physicists<br>1870 - 1893 | Mathematicians<br>1878 - 1890 | Chemists<br>1879 - 1891 |
|--|---------------------------|-------------------------------|-------------------------|
| Total People                           | 31                        | 21                            | 66                      |
| Total Articles                         | 466                       | 142                           | 707                     |
| Average Productivity Rate <sup>a</sup> | 0.81                      | 0.81                          | 1.08                    |
| Ph.D.'s <sup>b</sup>                   | 32.2% (10)                | 38.1% (8)                     | 48.5% (32)              |
| Foreign Ph.D.'s <sup>c</sup>           | 30 % (3)                  | 12.5% (1)                     | 56.3% (18)              |
| Foreign Study <sup>b</sup>             | 35.4% (11)                | 19 % (4)                      | 51.5% (34)              |
| Different Principal Field <sup>d</sup> | 32.2% (10)                | 19 % (4)                      | 0                       |

TABLE 2  
SECOND PERIOD

|  | Physicists<br>1894 - 1915 | Mathematicians<br>1891 - 1915 | Chemists<br>1892 - 1914 |
|--|---------------------------|-------------------------------|-------------------------|
| Total People                           | 33                        | 41                            | 99                      |
| Total Articles                         | 366                       | 631                           | 1,522                   |
| Average Productivity Rate <sup>a</sup> | 0.91                      | 1.00                          | 1.23                    |
| Ph.D.'s <sup>b</sup>                   | 90.9% (30)                | 90.2% (37)                    | 65.6% (65)              |
| Foreign Ph.D.'s <sup>c</sup>           | 30 % (9)                  | 45.9% (17)                    | 40 % (26)               |
| Foreign Study <sup>b</sup>             | 57.6% (19)                | 70 % (25)                     | 43.4% (43)              |
| Different Principal Field <sup>d</sup> | 9.1% (3)                  | 0                             | 0                       |

LESS PRODUCTIVE PHYSICISTS, MATHEMATICIANS, AND CHEMISTS

TABLE 3  
FIRST PERIOD

|  | Physicists<br>1870 - 1893 | Mathematicians<br>1878 - 1890 | Chemists<br>1879 - 1891 |
|--|---------------------------|-------------------------------|-------------------------|
| Total People                           | 186                       | 61                            | 261                     |
| Total Articles                         | 353                       | 90                            | 378                     |
| Average Productivity Rate <sup>a</sup> | 0.19                      | 0.26                          | 0.21                    |
| Ph.D.'s <sup>b</sup>                   | 24.2% (45)                | 39.3% (24)                    | 18 % (47)               |
| Foreign Ph.D.'s <sup>c</sup>           | 42.2% (19)                | 33.3% (8)                     | 40.4% (19)              |
| Foreign Study <sup>b</sup>             | 16.7% (31)                | 21.3% (13)                    | 14.5% (38)              |
| Different Principal Field <sup>d</sup> | 34.4% (64)                | 14.8% (9)                     | 0                       |

TABLE 4  
SECOND PERIOD

|  | Physicists<br>1894 - 1915 | Mathematicians<br>1891 - 1915 | Chemists<br>1892 - 1914 |
|--|---------------------------|-------------------------------|-------------------------|
| Total People                           | 480                       | 297                           | 2048 <sup>e</sup>       |
| Total Articles                         | 899                       | 632                           | 3766                    |
| Average Productivity Rate <sup>a</sup> | 0.25                      | 0.25                          | 0.22                    |
| Ph.D.'s <sup>b</sup>                   | 61.9% (297)               | 69 % (206)                    | 26.6% (544)             |
| Foreign Ph.D.'s <sup>c</sup>           | 15.8% (47)                | 10.7% (22)                    | 13.2% (72)              |
| Foreign Study <sup>b</sup>             | 19.2% (92)                | 20.5% (61)                    | 9 % (184)               |
| Different Principal Field <sup>d</sup> | 16.3% (78)                | 4.7% (14)                     | 0                       |

<sup>a</sup> articles per person per year; in Less Productive groups, rates of 1.00 or more omitted from calculation if based on three years or less.

<sup>b</sup> as percentage of entire disciplinary group.

<sup>c</sup> as percentage of total Ph.D.'s.

<sup>d</sup> Principal Field different from column title.

<sup>e</sup> absolute figures in this column obtained by multiplying sample figures by 8.

DISTRIBUTION OF DOMESTIC DOCTORATES BY PRODUCTIVITY GROUP

TABLE 5: FIRST PERIOD

| Physicists  |   |            |   | Mathematicians |   |            |   | Chemists    |   |            |   |
|-------------|---|------------|---|----------------|---|------------|---|-------------|---|------------|---|
| 1870 - 1893 |   |            |   | 1878 - 1890    |   |            |   | 1879 - 1891 |   |            |   |
| Less        |   | Productive |   | Less           |   | Productive |   | Less        |   | Productive |   |
| Total       | % | Total      | % | Total          | % | Total      | % | Total       | % | Total      | % |

TABLE 6: SECOND PERIOD

| Physicists<br>1894 - 1915 |   |       |   | Mathematicians<br>1891 - 1915 |   |       |   | Chemists<br>1892 - 1915      |   |       |   |
|---------------------------|---|-------|---|-------------------------------|---|-------|---|------------------------------|---|-------|---|
| Less Productive           |   |       |   | Less Productive               |   |       |   | Less <sup>b</sup> Productive |   |       |   |
| Total                     | % | Total | % | Total                         | % | Total | % | Total                        | % | Total | % |

|             |   |      |    |      |   |      |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------|---|------|----|------|---|------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Berkeley    |   |      |    |      |   |      |   |      | 1    | (04) |      |      | 3    | (01) |      | 1    | (01) | 1    | (03) | 16   | (04) |      |      |      |
| Brown       |   |      |    |      |   |      |   |      |      |      |      |      | 2    | (01) |      |      |      |      |      |      |      |      |      |      |
| Bryn Mawr   |   |      |    |      |   |      |   |      |      |      |      |      | 1    | (01) |      | 2    | (01) |      |      |      |      |      |      |      |
| Chicago     |   |      |    |      |   |      |   |      |      | 1    | (03) | 29   | (12) | 7    | (33) | 42   | (23) | 2    | (05) | 56   | (12) |      |      |      |
| Clark       |   |      |    |      |   |      |   |      |      |      |      | 10   | (04) | 1    | (05) | 13   | (26) |      |      | 8    | (02) |      |      |      |
| Columbia    |   |      |    |      |   |      |   | 2    | (14) | 3    | (11) | 1    | (03) | 20   | (08) | 1    | (05) | 10   | (06) | 5    | (13) | 56   | (12) |      |
| Cornell     |   |      | 1  | (04) | 1 | (14) | 1 | (06) |      |      | 10   | (34) | 49   | (20) | 1    | (05) | 16   | (10) | 2    | (05) | 40   | (08) |      |      |
| Harvard     | 1 | (14) | 4  | (15) | 1 | (14) |   |      | 3    | (21) | 2    | (07) | 11   | (38) | 13   | (05) | 1    | (05) | 19   | (11) | 4    | (11) | 48   | (10) |
| Hopkins     | 1 | (14) | 11 | (42) | 4 | (57) | 6 | (38) | 3    | (21) | 12   | (44) | 3    | (10) | 36   | (14) | 3    | (14) | 26   | (15) | 7    | (18) | 16   | (03) |
| Illinois    |   |      |    |      |   |      |   |      |      |      |      |      |      | 11   | (04) |      |      | 2    | (01) | 1    | (03) | 8    | (02) |      |
| Iowa        |   |      |    |      |   |      |   |      |      |      |      |      |      | 2    | (01) |      |      |      |      |      |      |      |      |      |
| Lafayette   |   |      |    |      |   |      |   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| MIT         |   |      |    |      |   |      |   |      | 1    | (04) |      |      |      |      |      | 2    | (01) |      |      | 8    | (02) |      |      |      |
| Michigan    |   |      | 1  | (04) |   |      |   |      |      |      | 2    | (07) |      |      | 2    | (01) |      |      |      |      |      |      |      |      |
| Minnesota   |   |      |    |      |   |      |   |      |      |      |      |      | 1    | (03) | 12   | (05) |      | 1    | (01) | 3    | (08) | 8    | (02) |      |
| Missouri    |   |      |    |      |   |      |   |      |      |      |      |      |      |      | 5    | (02) |      |      |      |      |      | 8    | (02) |      |
| Nebraska    |   |      |    |      |   |      |   |      |      | 1    | (04) |      |      |      |      |      |      |      |      |      |      | 16   | (04) |      |
| NYU         |   |      |    |      |   |      |   |      |      |      |      |      |      |      |      |      | 3    | (02) |      |      |      |      |      |      |
| NYU         |   |      |    |      |   |      |   |      | 1    | (04) |      |      |      | 2    | (01) |      |      |      |      |      |      | 8    | (02) |      |
| N. Carolina |   |      |    |      |   |      |   |      | 1    | (04) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Penn        |   |      |    |      |   |      |   |      |      |      |      |      |      |      |      |      |      |      |      |      | 1    | (03) | 8    | (02) |
| Princeton   |   |      |    |      |   |      | 2 | (13) |      |      |      |      | 1    | (03) | 11   | (04) |      | 4    | (02) | 2    | (05) | 56   | (12) |      |
| Stanford    |   |      |    |      |   |      |   |      |      |      |      |      |      |      | 18   | (07) |      | 10   | (06) | 1    | (03) | 8    | (02) |      |
|             |   |      |    |      |   |      |   |      |      |      |      |      |      |      | 5    | (02) |      | 1    | (05) |      |      |      |      |      |

# DISTRIBUTION OF DOMESTIC DOCTORATES BY PRODUCTIVITY GROUP

(Continued)

TABLE 5: FIRST PERIOD

TABLE 6: SECOND PERIOD

|                     | Physicists<br>1870 - 1893 |       |            |            | Mathematicians<br>1878 - 1890 |            |            |       | Chemists<br>1879 - 1891 |            |       |            | Physicists<br>1894 - 1915 |       |            |            | Mathematicians<br>1891 - 1915 |            |            |       | Chemists<br>1898 - 1915 |            |       |            |
|---------------------|---------------------------|-------|------------|------------|-------------------------------|------------|------------|-------|-------------------------|------------|-------|------------|---------------------------|-------|------------|------------|-------------------------------|------------|------------|-------|-------------------------|------------|-------|------------|
|                     | Less                      |       | Productive | Less       |                               | Productive | Less       |       | Productive              | Less       |       | Productive | Less                      |       | Productive | Less       |                               | Productive | Less       |       | Productive              | Less       |       | Productive |
|                     | Productive                | Total |            | Productive | Total                         |            | Productive | Total |                         | Productive | Total |            | Productive                | Total |            | Productive | Total                         |            | Productive | Total |                         | Productive | Total |            |
|                     | Total                     | %     | Total      | %          | Total                         | %          | Total      | %     | Total                   | %          | Total | %          | Total                     | %     | Total      | %          | Total                         | %          | Total      | %     | Total                   | %          | Total | %          |
| Wisconsin           |                           |       |            |            |                               |            |            |       |                         |            | 1     | (03)       | 10                        | (04)  |            |            | 1                             | (01)       | 1          | (03)  | 16                      | (05)       |       |            |
| Yale                | 4                         | (57)  | 6          | (23)       | 4                             | (25)       | 3          | (21)  | 2                       | (07)       |       |            | 2                         | (01)  | 2          | (10)       | 24                            | (13)       | 4          | (11)  | 48                      | (10)       |       |            |
| Others <sup>a</sup> | 1                         | (14)  | 3          | (12)       | 1                             | (14)       | 3          | (19)  | 2                       | (14)       | 1     | (04)       | 6                         |       | 4          | (19)       | 6                             | (03)       | 1          | (03)  | 40                      |            |       |            |
| Total               | 7                         |       | 26         |            | 7                             |            | 16         |       | 14                      |            | 27    |            | 29                        |       | 249        |            | 21                            |            | 182        |       | 38                      |            | 472   |            |

<sup>a</sup> Others are American, Boston, Catholic, Cincinnati, Colorado, Cumberland, Georgia, George Washington, Hillsdale, Illinois Wesleyan, Indiana, Marietta, McGill, Ohio State, Ohio Wesleyan, Omaha, Purdue, Stevens, Syracuse, Tulane, Washington and Jefferson, Virginia, Western Reserve, Unknown.

<sup>b</sup> absolute figures in this column obtained by multiplying sample figures by eight.

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## DISTRIBUTION OF DOMESTIC DOCTORATES: TOTAL

TABLE 7: FIRST PERIOD

TABLE 8: SECOND PERIOD

|                     | Physicists<br>1870 - 1893 |    | Mathematicians<br>1878 - 1890 |    | Chemists<br>1879 - 1891 |    | Physicists<br>1894 - 1915 |    | Mathematicians<br>1891 - 1915 |    | Chemists<br>1892 - 1915 |    |
|---------------------|---------------------------|----|-------------------------------|----|-------------------------|----|---------------------------|----|-------------------------------|----|-------------------------|----|
|                     | Total                     | %  | Total                         | %  | Total                   | %  | Total                     | %  | Total                         | %  | Total <sup>b</sup>      | %  |
| Berkeley            |                           |    |                               |    | 1                       | 02 | 3                         | 01 | 1                             |    | 136                     | 03 |
| Brown               |                           |    |                               |    |                         |    | 2                         | 01 |                               |    |                         |    |
| Bryn Mawr           |                           |    |                               |    |                         |    | 1                         | 01 | 2                             | 01 |                         |    |
| Chicago             |                           |    |                               |    |                         |    | 30                        | 11 | 49                            | 24 | 464                     | 11 |
| Clark               |                           |    |                               |    | 5                       | 12 | 10                        | 04 | 14                            | 27 | 64                      | 02 |
| Columbia            |                           |    |                               |    |                         |    | 21                        | 08 | 11                            | 05 | 488                     | 12 |
| Cornell             | 1                         | 03 | 2                             | 09 |                         |    | 59                        | 21 | 17                            | 09 | 336                     | 09 |
| Harvard             | 5                         | 15 | 1                             | 04 | 5                       | 12 | 24                        | 09 | 20                            | 10 | 416                     | 10 |
| Hopkins             | 12                        | 36 | 10                            | 43 | 15                      | 36 | 39                        | 14 | 29                            | 14 | 184                     | 04 |
| Illinois            |                           |    |                               |    |                         |    | 11                        | 04 | 2                             | 01 | 72                      | 02 |
| Iowa                |                           |    |                               |    |                         |    | 2                         | 01 |                               |    |                         |    |
| Lafayette           |                           |    |                               |    | 1                       | 02 |                           |    | 2                             | 01 | 64                      | 02 |
| MIT                 |                           |    |                               |    |                         |    | 2                         | 01 |                               |    | 24                      | 01 |
| Michigan            | 1                         | 03 |                               |    | 2                       | 5  | 12                        | 04 | 1                             |    | 88                      | 02 |
| Minnesota           |                           |    |                               |    |                         |    | 6                         | 02 |                               |    | 64                      | 02 |
| Missouri            |                           |    |                               |    | 1                       | 02 |                           |    |                               |    | 128                     | 03 |
| Nebraska            |                           |    |                               |    |                         |    |                           |    | 3                             | 01 |                         |    |
| NYU                 |                           |    |                               |    | 1                       | 02 | 2                         | 01 |                               |    | 64                      | 02 |
| North Carolina      |                           |    |                               |    | 1                       | 02 |                           |    |                               |    | 72                      | 02 |
| Penn                |                           |    |                               |    |                         |    | 11                        | 04 | 4                             | 02 | 464                     | 11 |
| Princeton           |                           |    | 2                             | 09 | 1                       | 02 | 19                        | 06 | 10                            | 05 | 72                      | 02 |
| Stanford            |                           |    |                               |    |                         |    | 5                         | 02 | 1                             |    |                         |    |
| Wisconsin           |                           |    |                               |    |                         |    | 11                        | 04 | 1                             |    | 136                     | 03 |
| Yale                | 10                        | 30 | 4                             | 17 | 5                       | 12 | 2                         | 01 | 26                            | 12 | 416                     | 10 |
| Others <sup>a</sup> | 4                         | 12 | 4                             | 17 | 3                       | 7  | 6                         | 02 | 10                            | 05 | 328                     | 08 |
| Total               | 33                        |    | 23                            |    | 41                      |    | 278                       |    | 203                           |    | 4080                    |    |

<sup>a</sup> See note <sup>a</sup>, Tables 5 and 6.

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## Average Doctoral Age

Table 9

|                | First Period <sup>a</sup> |                 |               | Second Period <sup>a</sup> |                 |              |
|----------------|---------------------------|-----------------|---------------|----------------------------|-----------------|--------------|
|                | Productive                | Less Productive | Total         | Productive                 | Less Productive | Total        |
| Physicists     | 25.7<br>(10)              | 28.4<br>(39)    | 27.8<br>(49)  | 28.8<br>(29)               | 29.4<br>(50)    | 29.2<br>(79) |
| Chemists       | 25.7<br>(43)              | 25.8<br>(30)    | 25.76<br>(73) | 26.5<br>(25)               | 28.1<br>(62)    | 27.0<br>(87) |
| Mathematicians | 26.1<br>(8)               | 27.4<br>(19)    | 27.0<br>(27)  | 26.1<br>(37)               | 30.6<br>(31)    | 28.2<br>(68) |

<sup>a</sup> Figures in parentheses are the number of people on which the averages were computed.

## Type of Chemical Research

Table 10

|   | First Period <sup>a</sup> |                 | Second Period <sup>a</sup> |                 |
|---|---------------------------|-----------------|----------------------------|-----------------|
|   | Productive                | Less Productive | Productive                 | Less Productive |
| P | 66.9 (473)                | 63.8 (241)      | 38.5 (890)                 | 38.8 (183)      |
| A | 23.6 (167)                | 28.0 (106)      | 35.8 (545)                 | 54.0 (255)      |
| M | 9.5 (67)                  | 8.2 (31)        | 5.7 (87)                   | 7.2 (34)        |

<sup>a</sup> As percentages; the figures in parentheses are the number of articles in the category.

DISTRIBUTION OF EMPLOYMENT <sup>a</sup>TABLE 11: FIRST PERIOD <sup>b</sup>TABLE 12: SECOND PERIOD <sup>b</sup>

|                | Physicists<br>1870 - 1893 |     |                    |      | Mathematicians<br>1878 - 1890 |      |                    |      | Chemists<br>1879 - 1891 |     |                    |     | Physicists<br>1894 - 1915 |     |                    |     | Mathematicians<br>1891 - 1915 |      |                    |     | Chemists<br>1892 - 1915 |     |  |  |
|----------------|---------------------------|-----|--------------------|------|-------------------------------|------|--------------------|------|-------------------------|-----|--------------------|-----|---------------------------|-----|--------------------|-----|-------------------------------|------|--------------------|-----|-------------------------|-----|--|--|
|                | Less<br>Productive        |     | Less<br>Productive |      | Less<br>Productive            |      | Less<br>Productive |      | Less<br>Productive      |     | Less<br>Productive |     | Less<br>Productive        |     | Less<br>Productive |     | Less<br>Productive            |      | Less<br>Productive |     | Less<br>Productive      |     |  |  |
|                | Total                     | %   | Total              | %    | Total                         | %    | Total              | %    | Total                   | %   | Total              | %   | Total                     | %   | Total              | %   | Total                         | %    | Total              | %   | Total                   | %   |  |  |
| Amherst        | 1                         | (2) | 3                  | (2)  |                               |      |                    |      |                         |     |                    |     |                           |     |                    |     |                               |      |                    |     |                         |     |  |  |
| Arizona        |                           |     |                    |      |                               |      |                    |      |                         |     |                    |     |                           |     |                    |     |                               |      |                    |     |                         |     |  |  |
| Armour         |                           |     |                    |      |                               |      |                    |      |                         |     |                    |     | 4                         | (1) |                    |     | 2                             | (1)  |                    |     |                         |     |  |  |
| Berkeley       | 1                         | (2) | 1                  | -    | 1                             | (4)  | 1                  | (2)  |                         |     | 1                  | (1) |                           |     |                    |     | 1                             | -    |                    |     |                         |     |  |  |
| Brown          |                           |     | 1                  | -    |                               |      |                    |      |                         |     | 1                  | (1) | 1                         | (2) |                    |     | 5                             | (2)  | 4                  | (3) | 25                      | (2) |  |  |
| Bryn Mawr      |                           |     | 1                  | -    |                               |      | 1                  | (2)  |                         |     |                    |     |                           |     |                    |     | 4                             | (1)  |                    |     |                         |     |  |  |
| Carnegie Inst. |                           |     |                    |      |                               |      |                    |      |                         |     |                    |     | 4                         | (1) |                    |     | 5                             | (2)  |                    |     |                         |     |  |  |
| Case           |                           |     | 2                  | (1)  |                               |      |                    |      | 1                       | (2) |                    |     | 1                         | (2) | 5                  | (1) |                               |      |                    |     | 16                      | (1) |  |  |
| Cath. U.       |                           |     |                    |      |                               |      |                    |      |                         |     |                    |     | 1                         | -   |                    |     |                               |      | 1                  | (1) | 8                       | -   |  |  |
| Chicago        |                           |     | 1                  | -    |                               |      | 1                  | (2)  | 1                       | (2) | 2                  | (2) |                           |     | 6                  | (2) | 6                             | (10) | 4                  | (1) | 4                       | (3) |  |  |
| Cincinnati     |                           |     |                    |      | 1                             | (4)  | 1                  | (2)  | 2                       | (3) | 1                  | (1) | 1                         | (2) | 5                  | (1) |                               |      | 2                  | (1) | 1                       | (1) |  |  |
| CCNY           |                           |     | 1                  | -    |                               |      |                    |      | 3                       | (5) |                    |     |                           |     | 5                  | (1) | 1                             | (2)  | 1                  | -   | 2                       | (2) |  |  |
| Clark          |                           |     |                    |      | 1                             | (4)  | 2                  | (3)  |                         |     |                    |     |                           | 6   | (2)                |     |                               | 5    | (2)                | 1   | (1)                     |     |  |  |
| Columbia       | 1                         | (2) |                    |      |                               |      |                    |      | 1                       | (2) | 3                  | (2) | 1                         | (2) | 10                 | (3) | 2                             | (3)  | 13                 | (4) | 7                       | (6) |  |  |
| Cornell        | 1                         | (2) | 7                  | (4)  |                               |      | 4                  | (6)  | 2                       | (3) | 2                  | (2) | 2                         | (4) | 21                 | (6) | 2                             | (3)  | 12                 | (4) | 2                       | (2) |  |  |
| Dartmouth      |                           |     |                    |      |                               |      |                    |      |                         |     |                    | 1   | (2)                       | 3   | (1)                |     |                               | 6    | (2)                |     |                         |     |  |  |
| Georgia        |                           |     |                    |      |                               |      |                    |      |                         |     |                    |     |                           | 2   | -                  |     |                               | 1    | -                  |     |                         |     |  |  |
| Ga. Tech.      |                           |     |                    |      |                               |      |                    |      |                         |     |                    |     |                           |     |                    |     |                               |      |                    | 1   | (1)                     |     |  |  |
| Geo. Wash.     |                           |     |                    |      |                               |      |                    |      |                         |     |                    |     |                           |     |                    |     |                               |      |                    |     |                         |     |  |  |
| Goucher        |                           |     |                    |      |                               |      |                    |      | 1                       | (1) |                    |     |                           |     | 2                  | -   |                               |      |                    |     |                         |     |  |  |
| Harvard        | 2                         | (4) | 24                 | (15) |                               |      | 2                  | (3)  | 5                       | (9) | 5                  | (4) | 2                         | (4) | 11                 | (3) | 4                             | (7)  | 10                 | (3) | 4                       | (3) |  |  |
| Haverford      |                           |     | 4                  | (2)  |                               |      |                    |      | 1                       | (2) | 1                  | (1) | 1                         | (2) |                    |     | 1                             | (2)  | 4                  | (1) |                         |     |  |  |
| Hopkins        | 1                         | (2) | 12                 | (7)  | 9                             | (32) | 9                  | (14) | 3                       | (5) | 1                  | (1) | 1                         | (2) | 6                  | (2) | 3                             | (5)  | 9                  | (3) |                         |     |  |  |
| Idaho          |                           |     |                    |      |                               |      |                    |      |                         |     |                    |     |                           |     | 3                  | (1) |                               |      | 1                  | -   |                         |     |  |  |
| Illinois       |                           |     |                    |      |                               |      | 1                  | (2)  | 1                       | (2) | 1                  | (1) | 2                         | (4) | 8                  | (2) | 1                             | (2)  | 13                 | (4) | 6                       | (5) |  |  |
| Indiana        |                           |     | 1                  | -    |                               |      |                    |      |                         |     |                    |     | 1                         | (2) | 5                  | (1) |                               |      | 2                  | (1) |                         | 8   |  |  |

DISTRIBUTION OF EMPLOYMENT <sup>a</sup>  
(Continued)

TABLE 11: FIRST PERIOD <sup>b</sup>

TABLE 12: SECOND PERIOD <sup>b</sup>

|               | Physicists<br>1870 - 1893 |            |            |            | Mathematicians<br>1878 - 1890 |            |            |            | Chemists<br>1879 - 1891 |            |            |            | Physicists<br>1894 - 1915 |            |            |            | Mathematicians<br>1891 - 1915 |            |            |            | Chemists<br>1892 - 1915 |     |  |  |
|---------------|---------------------------|------------|------------|------------|-------------------------------|------------|------------|------------|-------------------------|------------|------------|------------|---------------------------|------------|------------|------------|-------------------------------|------------|------------|------------|-------------------------|-----|--|--|
|               | Less                      |            | Less       |            | Less                          |            | Less       |            | Less                    |            | Less       |            | Less                      |            | Less       |            | Less                          |            | Less       |            | Less                    |     |  |  |
|               | Productive                | Productive | Productive | Productive | Productive                    | Productive | Productive | Productive | Productive              | Productive | Productive | Productive | Productive                | Productive | Productive | Productive | Productive                    | Productive | Productive | Productive | Productive              |     |  |  |
|               | Total                     | %          | Total      | %          | Total                         | %          | Total      | %          | Total                   | %          | Total      | %          | Total                     | %          | Total      | %          | Total                         | %          | Total      | %          | Total                   | %   |  |  |
| Iowa State    |                           |            |            |            |                               |            |            |            |                         |            |            |            | 5                         | (1)        |            |            | 1                             | -          | 1          | (1)        | 1                       | (1) |  |  |
| Kansas        |                           |            | 1          | -          |                               |            | 1          | (2)        |                         |            | 1          | (2)        | 3                         | (1)        |            |            | 5                             | (2)        | 1          | (1)        | 16                      | (1) |  |  |
| Knox          |                           |            |            |            |                               |            |            |            |                         |            |            |            |                           |            |            |            |                               |            |            |            |                         |     |  |  |
| Lafayette     |                           |            | 2          | (1)        |                               |            |            |            | 1                       | (2)        | 1          | (1)        |                           |            | 2          | -          |                               |            |            |            |                         |     |  |  |
| Lehigh        |                           |            |            |            |                               |            |            |            |                         |            |            |            | 1                         | (2)        | 3          | (1)        |                               |            | 3          | (1)        |                         |     |  |  |
| Maine         |                           |            |            |            |                               |            |            |            |                         |            |            |            |                           |            |            |            |                               |            |            |            | 8                       | -   |  |  |
| MIT           | 7                         | (15)       |            |            |                               |            |            |            | 2                       | (3)        | 3          | (2)        | 1                         | (2)        | 6          | (?)        | 1                             | (2)        | 7          | (2)        | 7                       | (6) |  |  |
| Michigan      |                           |            | 2          | (1)        | 1                             | (4)        | 2          | (3)        | 1                       | (2)        | 4          | (3)        | 3                         | (6)        | 14         | (4)        |                               |            | 9          | (3)        | 3                       | (3) |  |  |
| Minnesota     |                           |            | 1          | -          |                               |            |            |            |                         |            |            |            | 2                         | (4)        | 8          | (2)        |                               |            | 1          | -          | 2                       | (2) |  |  |
| Missouri      |                           |            |            |            |                               |            |            |            |                         |            | 2          | (2)        |                           |            | 5          | (1)        | 1                             | (2)        | 5          | (2)        |                         |     |  |  |
| Mt. Holyoke   |                           |            |            |            |                               |            |            |            |                         |            |            |            |                           |            |            |            |                               | 3          | (1)        |            |                         |     |  |  |
| Nebraska      |                           |            |            |            |                               |            | 1          | (2)        |                         |            | 1          | (1)        |                           |            | 7          | (2)        |                               |            | 7          | (2)        | 2                       | (2) |  |  |
| New Hampshire |                           |            |            |            |                               |            |            |            |                         |            |            |            |                           |            |            |            |                               |            |            |            | 2                       | (2) |  |  |
| N. Carolina   |                           |            |            |            |                               |            |            |            | 1                       | (2)        | 2          | (2)        |                           |            |            |            |                               |            |            |            | 2                       | (2) |  |  |
| N. Dakota     |                           |            |            |            |                               |            |            |            |                         |            |            |            |                           |            |            |            |                               |            |            |            | 3                       | (3) |  |  |
| Northwestern  |                           |            |            |            |                               |            |            |            |                         |            |            |            | 2                         | (4)        | 2          | -          |                               |            |            |            |                         |     |  |  |
| Ohio State    |                           |            | 3          | (2)        |                               |            | 1          | (2)        |                         |            | 2          | (2)        |                           |            | 2          | -          | 1                             | (2)        | 6          | (2)        | 2                       | (2) |  |  |
| Oklahoma      |                           |            | 1          | -          | 1                             | (4)        |            |            | 1                       | (2)        |            |            | 3                         | (6)        | 8          | (2)        |                               |            | 4          | (1)        |                         |     |  |  |
| Oregon        |                           |            |            |            |                               |            |            |            |                         |            |            |            |                           |            |            |            |                               | 2          | (1)        |            |                         |     |  |  |
| Pennsylvania  |                           |            |            |            |                               |            |            |            |                         |            |            |            |                           |            | 2          | -          |                               |            | 2          | (1)        |                         |     |  |  |
| Penn State    |                           |            | 1          | -          |                               |            | 2          | (3)        | 1                       | (2)        | 4          | (3)        |                           |            | 7          | (2)        | 5                             | (9)        |            |            | 3                       | (3) |  |  |
| Pittsburgh    |                           |            |            |            |                               |            |            |            |                         |            |            |            |                           |            | 2          | -          | 3                             | (5)        |            |            |                         |     |  |  |
| Princeton     | 2                         | (4)        | 3          | (2)        |                               |            | 1          | (2)        | 1                       | (2)        | 1          | (1)        | 3                         | (6)        | 8          | (1)        | 7                             | (12)       | 14         | (5)        |                         |     |  |  |

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DISTRIBUTION OF EMPLOYMENT <sup>a</sup>  
(Continued)

TABLE 11: FIRST PERIOD <sup>b</sup>

TABLE 12: SECOND PERIOD <sup>b</sup>

|               | Physicists<br>1870 - 1893 |      |       |     | Mathematicians<br>1878 - 1890 |   |       |     | Chemists<br>1879 - 1891 |     |       |     | Physicists<br>1894 - 1915 |     |       |     | Mathematicians<br>1891 - 1915 |     |       |     | Chemists<br>1892 - 1915 |     |       |     |
|---------------|---------------------------|------|-------|-----|-------------------------------|---|-------|-----|-------------------------|-----|-------|-----|---------------------------|-----|-------|-----|-------------------------------|-----|-------|-----|-------------------------|-----|-------|-----|
|               | Productive                |      | Less  |     | Productive                    |   | Less  |     | Productive              |     | Less  |     | Productive                |     | Less  |     | Productive                    |     | Less  |     | Productive              |     | Less  |     |
|               | Total                     | %    | Total | %   | Total                         | % | Total | %   | Total                   | %   | Total | %   | Total                     | %   | Total | %   | Total                         | %   | Total | %   | Total                   | %   | Total | %   |
| Purdue        |                           |      | 1     | -   |                               |   |       |     | 2                       | (3) | 1     | (1) |                           |     | 6     | (2) |                               |     | 5     | (2) |                         |     |       |     |
| Rice          |                           |      |       |     |                               |   |       |     |                         |     |       |     |                           |     | 2     | -   |                               |     | 2     | (1) |                         |     |       |     |
| Rutgers       |                           |      |       |     |                               |   |       |     | 1                       | (2) | 5     | (4) |                           |     |       |     |                               |     | 1     | -   |                         |     | 8     | -   |
| Smith         |                           |      |       |     |                               |   |       |     |                         |     | 1     | (1) |                           |     | 2     | -   |                               |     | 2     | (1) |                         |     |       |     |
| Stanford      |                           |      |       |     |                               |   |       |     |                         |     |       |     | 2                         | (4) | 6     | (2) | 2                             | (3) | 6     | (2) | 2                       | (2) | 1     | (1) |
| Stevens       | 1                         | (2)  | 2     | (1) |                               |   | 2     | (3) | 1                       | (2) |       |     |                           |     | 7     | (2) | 1                             | (2) | 3     | (1) |                         |     |       |     |
| Syracuse      |                           |      |       |     |                               |   |       |     |                         |     |       |     |                           |     |       |     |                               |     |       |     | 1                       |     |       |     |
| Tennessee     |                           |      |       |     |                               |   |       |     | 1                       | (2) | 3     | (2) |                           |     |       |     |                               |     | 1     | -   |                         |     |       |     |
| Texas         |                           |      |       |     |                               |   | 2     | (3) |                         |     |       |     |                           |     |       |     | 2                             | (3) | 3     | (1) |                         |     |       |     |
| Tufts         |                           |      | 1     | -   |                               |   |       |     | 2                       | (3) |       |     |                           |     |       |     |                               |     |       |     |                         |     |       |     |
| Utah          |                           |      |       |     |                               |   |       |     |                         |     |       |     |                           |     |       |     |                               |     |       |     |                         |     |       |     |
| Vassar        |                           |      | 1     | -   |                               |   |       |     |                         |     | 1     | (1) |                           |     | 4     | (1) |                               |     |       |     |                         |     |       |     |
| Virginia      |                           |      |       |     |                               |   | 2     | (3) | 2                       | (3) | 1     | (1) |                           |     | 3     | (1) | 1                             | (2) | 1     | -   |                         |     |       |     |
| U. Wash.      |                           |      |       |     |                               |   |       |     |                         |     |       |     |                           |     |       |     | 1                             | (2) | 2     | (1) |                         |     |       |     |
| Wash. U.      |                           |      |       |     |                               |   |       |     | 1                       | (2) |       |     |                           |     | 3     | (1) |                               |     | 4     | (1) | 2                       | (2) | 8     | -   |
| Wash. & Jeff. |                           |      |       |     |                               |   |       |     |                         |     |       |     |                           |     |       |     | 1                             | (2) | 3     | (1) |                         |     | 8     | -   |
| Wash. & Lee   |                           |      |       |     |                               |   |       |     |                         |     | 2     | (2) |                           |     |       |     |                               |     |       |     |                         |     |       |     |
| Wellesley     |                           |      | 1     | -   |                               |   |       |     |                         |     |       |     |                           |     |       |     |                               |     |       |     | 1                       | (1) |       |     |
| Wesleyan      |                           |      | 1     | -   |                               |   |       |     | 1                       | (2) |       |     |                           |     | 3     | (1) | 1                             | (2) | 4     | (1) | 2                       | (2) | 16    | (1) |
| W. Reserve    |                           |      |       |     |                               |   |       |     | 1                       | (2) |       |     |                           |     | 3     | (1) |                               |     | 2     | (1) |                         |     | 8     | -   |
| West Virginia |                           |      |       |     |                               |   |       |     |                         |     |       |     |                           |     | 2     | -   | 1                             | (2) |       |     |                         |     |       |     |
| Williams      |                           |      |       |     |                               |   |       |     |                         |     |       |     |                           |     | 2     | -   |                               |     |       |     |                         |     |       |     |
| Wisconsin     |                           |      |       |     |                               |   | 1     | (2) |                         |     |       |     | 2                         | (4) | 11    | (3) | 1                             | (2) | 8     | (3) | 2                       | (2) | 72    | (5) |
| Yale          | 8                         | (17) | 11    | (7) |                               |   | 2     | (3) | 4                       | (6) | 5     | (4) |                           |     | 2     | -   | 2                             | (3) | 18    | (6) | 44                      | (3) | 32    | (2) |

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DISTRIBUTION OF EMPLOYMENT <sup>a</sup>

(Continued)

TABLE 11: FIRST PERIOD <sup>b</sup>TABLE 12: SECOND PERIOD <sup>b</sup>

|  | Physicists<br>1870-1893 |            |            |            | Mathematicians<br>1878 - 1890 |            |            |            | Chemists<br>1879 - 1891 |            |            |            | Physicists<br>1894 - 1915 |            |            |            | Mathematicians<br>1891 - 1915 |            |            |            | Chemists<br>1892 - 1915 |            |            |            |
|--|-------------------------|------------|------------|------------|-------------------------------|------------|------------|------------|-------------------------|------------|------------|------------|---------------------------|------------|------------|------------|-------------------------------|------------|------------|------------|-------------------------|------------|------------|------------|
|  | Less                    |            | Less       |            | Less                          |            | Less       |            | Less                    |            | Less       |            | Less                      |            | Less       |            | Less                          |            | Less       |            | Less                    |            | Less       |            |
|  | Productive              | Productive | Productive | Productive | Productive                    | Productive | Productive | Productive | Productive              | Productive | Productive | Productive | Productive                | Productive | Productive | Productive | Productive                    | Productive | Productive | Productive | Productive              | Productive | Productive | Productive |
|  | Total                   | %          | Total      | %          | Total                         | %          | Total      | %          | Total                   | %          | Total      | %          | Total                     | %          | Total      | %          | Total                         | %          | Total      | %          | Total                   | %          | Total      | %          |
| Worcester                                    |                         |            |            |            |                               |            |            |            | 1                       | (2)        |            |            | 6                         | (2)        |            |            | 1                             | -          |            |            | 8                       | -          |            |            |
| Observatories                                | 3                       | (6)        | 7          | (4)        | 1                             | (4)        | 1          | (3)        |                         |            |            |            |                           |            |            |            | 3                             | (1)        |            |            |                         |            |            |            |
| Agricultural<br>Colleges                     |                         |            |            |            |                               |            |            |            | 2                       | (3)        | 2          | (2)        |                           |            |            |            |                               |            |            |            | 16                      | (1)        |            |            |
| Agricultural<br>Experiment<br>Stations       |                         |            |            |            |                               |            |            |            | 2                       | (3)        | 6          | (5)        |                           |            |            |            |                               |            |            | 9          | (8)                     | 88         | (6)        |            |
| Medical Colleges<br>and Hospitals            |                         |            |            |            |                               |            |            |            | 2                       | (3)        | 5          | (4)        |                           |            |            |            |                               |            |            | 4          | (3)                     | 32         | (2)        |            |
| Other Colleges 12<br>and Universities        | (25)                    | 15         | (9)        | 4          | (14)                          | 9          | (14)       | 2          | (3)                     | 17         | (24)       | 9          | (18)                      | 34         | (9)        | 3          | (5)                           | 40         | (13)       | 2          | (2)                     | 160        | (10)       |            |
| Coast Survey                                 | 1                       | (2)        | 7          | (4)        | 2                             | (7)        | 4          | (5)        |                         |            |            |            |                           | 3          | (1)        |            |                               | 1          | -          |            |                         |            |            |            |
| Geological<br>Survey                         | 2                       | (4)        | 8          | (5)        | 1                             | (4)        | 1          | (2)        | 1                       | (2)        | 7          | (6)        |                           | 1          | -          |            |                               |            |            | 1          | (1)                     |            |            |            |
| Bureau of<br>Standards                       |                         |            |            |            |                               |            |            |            |                         |            |            |            | 2                         | (4)        | 18         | (5)        |                               |            |            | 4          | (3)                     | 16         | (1)        |            |
| Bureau of Mines<br>Agriculture<br>Department |                         |            |            |            |                               | 2          | (3)        | 2          | (2)                     |            |            |            |                           | 6          | (2)        |            |                               |            |            | 13         | (11)                    | 112        | (7)        |            |
| Weather Bureau                               |                         |            |            |            |                               |            |            |            |                         |            |            |            |                           | 3          | (1)        |            |                               |            |            |            |                         |            |            |            |
| Army   | 3                       | (6)        | 5          | (3)        |                               |            | 1          | (2)        |                         |            |            |            |                           |            |            |            |                               |            | 1          | -          |                         |            |            |            |

DISTRIBUTION OF EMPLOYMENT <sup>a</sup>

(Continued)

TABLE 11: FIRST PERIOD <sup>b</sup>TABLE 12: SECOND PERIOD <sup>b</sup>

|                                 | Physicists<br>1870-1893 |            |            |            | Mathematicians<br>1878 - 1890 |            |            |            | Chemists<br>1879 - 1891 |            |            |            | Physicists<br>1894 - 1915 |            |            |            | Mathematicians<br>1891 - 1915 |            |            |            | Chemists<br>1892 - 1915 |            |            |            |
|---------------------------------|-------------------------|------------|------------|------------|-------------------------------|------------|------------|------------|-------------------------|------------|------------|------------|---------------------------|------------|------------|------------|-------------------------------|------------|------------|------------|-------------------------|------------|------------|------------|
|                                 | Less                    |            | Less       |            | Less                          |            | Less       |            | Less                    |            | Less       |            | Less                      |            | Less       |            | Less                          |            | Less       |            | Less                    |            | Less       |            |
|                                 | Productive              | Productive | Productive | Productive | Productive                    | Productive | Productive | Productive | Productive              | Productive | Productive | Productive | Productive                | Productive | Productive | Productive | Productive                    | Productive | Productive | Productive | Productive              | Productive | Productive | Productive |
|                                 | Total                   | %          | Total      | %          | Total                         | %          | Total      | %          | Total                   | %          | Total      | %          | Total                     | %          | Total      | %          | Total                         | %          | Total      | %          | Total                   | %          | Total      | %          |
| Navy                            | 2                       | (4)        | 7          | (4)        | 2                             | (7)        | 3          | (5)        |                         |            | 3          | (2)        |                           | 2          | -          | 1          | (2)                           | 5          | (2)        |            |                         | 16         | (1)        |            |
| State & Local<br>Health Dep'ts. |                         |            |            |            |                               |            |            |            | 2                       | (3)        | 3          | (2)        |                           |            |            |            |                               |            |            | 1          | (1)                     | 24         | (2)        |            |
| Misc. State &<br>Local Agencies |                         |            |            |            |                               |            |            |            |                         |            | 2          | (2)        |                           | 1          | -          |            | 1                             | -          |            | 1          | (1)                     | 32         | (2)        |            |
| Misc. Federal<br>Agencies       |                         |            |            |            |                               |            |            |            | 1                       | (2)        | 2          | (2)        |                           |            |            |            | 1                             | -          |            | 1          | (1)                     |            |            |            |
| Business and<br>Industry        |                         |            | 6          | (4)        | 2                             | (7)        | 5          | (8)        | 5                       | (9)        | 8          | (6)        | 3                         | (6)        | 44         | (12)       | 1                             | (2)        | 13         | (4)        | 9                       | (8)        | 296        | (19)       |
| Independent                     | 3                       | (6)        | 20         | (12)       | 1                             | (4)        |            |            |                         |            | 9          | (7)        |                           | 5          | (1)        |            |                               |            |            | 3          | (3)                     | 40         | (3)        |            |
| Total                           | 48                      |            | 165        |            | 28                            |            | 63         |            | 63                      |            | 124        |            | 51                        |            | 379        |            | 58                            |            | 311        |            | 117                     |            | 1584       |            |

<sup>a</sup> If more than one major position was held, all have been centered. Hence, the number of positions exceeds the number of scientists or mathematicians in a given group.

<sup>b</sup> All percentages have been rounded off and omitted if less than 0.5.

<sup>c</sup> Sample figures times eight.

# Characteristics of Professional Society Officers

Table 13

|                                      | American<br>Chemical Society<br>1879-1891 |      | Productive<br>Chemists<br>1879-1891 | American<br>Chemical Society<br>1892-1914 |                   | Productive<br>Chemists<br>1892-1914 | American<br>Mathematical Society<br>1892-1915 |                   | Productive<br>Mathematicians<br>1892-1915 | American<br>Physical Society<br>1899-1915 |                   | Productive<br>Physicists<br>1894-1915 |
|--------------------------------------|---|------|-------------------------------------|---|-------------------|-------------------------------------|---|-------------------|---|---|-------------------|---------------------------------------|
|                                      | Total                                     | %    |                                     | Total                                     | %                 |                                     | Total   | %                 |   | Total                                     | %                 |                                       |
| Officers Listed                      | 61  |      |                                     | 166                                       |                   |                                     | 91  |                   | 41  | 40  |                   | 33                                    |
| Officers with Information            | 38  |      |                                     | 145                                       |                   |                                     | 91  |                   |   | 40  |                   |                                       |
| Ph. D. 's                            | 21  | 55.3 | 48.5 %                              | 100                                       | 68.9              | 65.6 %                              | 69  | 75.8              | 90.2 %                                    | 31  | 77.5              | 65.6 %                                |
| Foreign Ph. D. 's <sup>c</sup>       | 12  | 57.1 | 56.3 %                              | 47  | 47.0              | 40.0 %                              | 28  | 40.6              | 45.9 %                                    | 12  | 38.7              | 30.0 %                                |
| Foreign Study <sup>d</sup>           | 16  | 42.1 | 51.5 %                              | 77  | 46.3              | 43.4 %                              | 51  | 56.0              | 70.0 %                                    | 22  | 55                | 57.6 %                                |
| Average Productivity Rate            | 0.76                                      | —    | 1.08%                               | 0.51                                      | —                 | 1.23%                               | 0.54  | —                 | 1.00%                                     | 0.47                                      | —                 | 0.91%                                 |
| High Producers <sup>a, e</sup>       | 16  | 57.1 |                                     | 60  | 49.6              |                                     | 39  | 60.0              |   | 19  | 55.8              |                                       |
| Publishers <sup>b, d</sup>           | 40  | 65.5 |                                     | 121                                       | 72.9              |                                     | 66  | 72.5              |   | 35  | 87.5              |                                       |
| Employment Characteristics           |   |      |                                     |   |                   |                                     |   |                   |   |   |                   |                                       |
| Total Positions                      | 50  |      |                                     | 191                                       |                   |                                     | 101   |                   |   | 45  |                   |                                       |
| Total Institutions                   | 41  | 1.22 |                                     | 123                                       | 1.55 <sup>g</sup> |                                     | 40  | 2.52 <sup>g</sup> |   | 31  | 1.45 <sup>g</sup> |                                       |
| High Claim Institutions <sup>f</sup> | 0   | 0    |                                     | 11 (47)                                   | 24.6              |                                     | 10 (57)                                       | 56.5              |   | 1 (4)                                     | 9.9               |                                       |
| Positions in:                        |   |      |                                     |   |                   |                                     |   |                   |   |   |                   |                                       |
| -Academic Institutions               | 26  | 52   | 84%                                 | 114                                       | 59.7              | 76.1 %                              | 96  | 95.0              | 96.5 %                                    | 38  | 84.4              | 90.2 %                                |
| -Public                              | 7   | 14   |                                     | 54  | 28.3              |                                     | 23  | 22.8              |   | 10  | 22.2              |                                       |
| -Private                             | 19  | 38   |                                     | 60  | 31.4              |                                     | 73  | 72.3              |   | 28  | 62.2              |                                       |
| Ag. Exp't. Stns.                     |   |      | 3%                                  | 4   | 2.1               | 7.7 %                               |   |                   |   |   |                   |                                       |
| Medical Institutions                 | 2   | 4    | 3%                                  | 9   | 4.7               | 3.4 %                               |   |                   |   |   |                   |                                       |
| Federal Agencies                     | 3   | 6    | 7%                                  | 16  | 9.4               | 17.1 %                              | 3   | 3.0               | 2%  | 6   | 13.3              | 4%                                    |
| State and Local Agencies             | 3   | 6    | 3%                                  | 4   | 2.1               | 1.0 %                               |   |                   |   |   |                   |                                       |
| Business and Industry                | 11  | 22   | 9%                                  | 35  | 18.3              | 7.7 %                               | 2   | 2.0               | 2%  | 1   | 2.2               | 6%                                    |
| Independent                          | 5   | 10   |                                     | 9   | 4.7               | 3.0 %                               |   |                   |   |   |                   |                                       |

<sup>a</sup> Defined as people with productivity rates of 0.33 or higher and those designated as high producers.

<sup>b</sup> Means listed in one of the productivity appendices. For the case of the later chemists, those not listed were checked against the total group from which the sample was drawn and entered if found there.

<sup>c</sup> Percentages as total of Ph. D. 's.

<sup>d</sup> Percentages as total of group.

<sup>e</sup> Percentages as total of officers with productivity rates.

<sup>f</sup> Institutions with 4 or more positions. Numbers in parentheses are total positions held in these institutions. The percentages are of total positions.

<sup>g</sup> Positions per institution.

Table 14: Physics, Mathematics, and Chemistry.  
Doctorates Awarded in the United States

|                | Physics |         | Mathematics |         | Chemistry |         | Total   | Total   |
|----------------|---------|---------|-------------|---------|-----------|---------|---------|---------|
|                | To 1897 | 1898-15 | To 1897     | 1898-15 | To 1897   | 1898-15 | To 1897 | 1898-15 |
| Berkeley       | 0       | 2       | 0           | 1       | 1         | 1       | 1       | 4       |
| Brown          | 1       | 2       | 0           | 0       | 0         | 0       | 1       | 2       |
| Bryn Mawr      | 0       | 1       | 0           | 2       | 0         | 0       | 0       | 3       |
| Chicago        | 2       | 25      | 2           | 42      | 1         | 8       | 5       | 75      |
| Clark          | 4       | 7       | 5           | 7       | 0         | 1       | 9       | 15      |
| Columbia       | 2       | 17      | 3           | 8       | 7         | 9       | 12      | 34      |
| Cornell        | 8       | 49      | 3           | 15      | 0         | 6       | 11      | 70      |
| Harvard        | 5       | 15      | 4           | 15      | 9         | 6       | 18      | 36      |
| Hopkins        | 23      | 26      | 16          | 19      | 21        | 3       | 60      | 48      |
| Illinois       | 0       | 10      | 0           | 2       | 0         | 2       | 0       | 14      |
| Iowa           | 0       | 2       | 0           | 0       | 0         | 0       | 0       | 2       |
| Lafayette      | 0       | 0       | 0           | 0       | 0         | 1       | 0       | 1       |
| MIT            | 0       | 2       | 0           | 0       | 1         | 3       | 1       | 5       |
| Michigan       | 1       | 12      | 0           | 1       | 3         | 2       | 4       | 15      |
| Minnesota      | 0       | 5       | 0           | 0       | 0         | 1       | 0       | 6       |
| Missouri       | 0       | 0       | 0           | 0       | 1         | 2       | 1       | 2       |
| Nebraska       | 0       | 0       | 0           | 2       | 0         | 0       | 0       | 2       |
| NYU            | 0       | 2       | 0           | 0       | 1         | 1       | 1       | 3       |
| North Carolina | 0       | 0       | 0           | 0       | 2         | 1       | 2       | 1       |
| Pennsylvania   | 0       | 11      | 0           | 3       | 0         | 9       | 0       | 23      |
| Princeton      | 2       | 10      | 4           | 7       | 1         | 1       | 7       | 18      |
| Stanford       | 0       | 5       | 0           | 1       | 0         | 0       | 0       | 6       |
| Wisconsin      | 0       | 11      | 1           | 0       | 1         | 3       | 2       | 14      |
| Yale           | 13      | 3       | 7           | 20      | 7         | 8       | 27      | 31      |
| Others         | 6       | 8       | 11          | 4       | 6         | 4       | 23      | 16      |
| Total          | 67      | 225     | 56          | 149     | 62        | 72      | 185     | 446     |

Table 15: Physics, Mathematics, and Chemistry  
Doctorates Awarded Abroad

|            | Physics |         | Mathematics |         | Chemistry |         | Total   | Total   |
|------------|---------|---------|-------------|---------|-----------|---------|---------|---------|
|            | To 1897 | 1898-15 | To 1897     | 1898-15 | To 1897   | 1898-15 | To 1897 | 1898-15 |
| Berlin     | 12      | 8       | 3           | 0       | 7         | 1       | 22      | 9       |
| Bonn       | 1       | 0       | 0           | 1       | 0         | 0       | 1       | 1       |
| Bordeaux   | 0       | 1       | 0           | 1       | 0         | 0       | 0       | 2       |
| Edinburgh  | 1       | 1       | 1           | 1       | 0         | 0       | 2       | 2       |
| Evlangen   | 0       | 0       | 1           | 1       | 0         | 0       | 1       | 1       |
| Freiburg   | 0       | 0       | 0           | 0       | 1         | 2       | 1       | 2       |
| Giessen    | 0       | 1       | 0           | 0       | 1         | 0       | 1       | 1       |
| Göttingen  | 6       | 5       | 9           | 8       | 20        | 2       | 35      | 15      |
| Heidelberg | 5       | 3       | 5           | 2       | 6         | 2       | 16      | 7       |
| Leipzig    | 7       | 3       | 5           | 2       | 6         | 2       | 18      | 7       |
| London     | 0       | 2       | 2           | 0       | 0         | 0       | 2       | 2       |
| Marburg    | 1       | 6       | 0           | 0       | 1         | 0       | 2       | 6       |
| Munich     | 0       | 3       | 0           | 1       | 6         | 0       | 6       | 4       |
| Strasbourg | 3       | 0       | 0           | 2       | 0         | 0       | 3       | 2       |
| Tübingen   | 1       | 0       | 0           | 0       | 3         | 0       | 4       | 0       |
| Würzburg   | 3       | 1       | 0           | 0       | 2         | 0       | 5       | 1       |
| Zürich     | 0       | 0       | 0           | 1       | 2         | 1       | 2       | 3       |
| Others     | 1       | 1       | 3           | 1       | 3         | 2       | 7       | 4       |
| Total      | 41      | 36      | 29          | 21      | 58        | 12      | 128     | 69      |

Others include Basel, Berne, Cambridge, Christiana, Geneva, Jena, Pan's, St. Andrews (Scotland), St. Petersburg, Upsala, Vienna.

Source: Appendices I-XI.

# APPENDIX I

## PRODUCTIVE PHYSICISTS

Seven or More Articles

1870 - 1893

| <u>Name</u>       | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Total</u><br><u>Articles</u> | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1894-1915</u> | <u>Productivity</u><br><u>Rate</u> |
|-------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|---------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| Barus, C.         | Wurzburg     | 79                          | X                              | USGS                                  | 26                              |                                  | X                                 | 1.86                               |
| Becker, G. F.     | Heidelberg   | 69                          | X                              | USGS                                  | 12                              | G                                |                                   | 0.50                               |
| Dana, J. D.       | No           |                             | X                              | Yale                                  | 8                               | G                                |                                   | 0.33                               |
| Draper, H.        | No           |                             | X                              | CCNY; Various Observatories           | 11                              | A                                |                                   | 0.92                               |
| Ferrel, W.        | No           |                             |                                | Kansas City, Missouri                 | 7                               | G                                |                                   | 0.32                               |
|                   |              |                             |                                | U.S. Army Signal Corps                |                                 |                                  |                                   |                                    |
| Gibbs, J. W.      | Yale         | 63                          | X                              | Yale                                  | 8                               |                                  |                                   | 0.33                               |
| Hall, E. H.       | Hopkins      | 80                          |                                | Harvard                               | 7                               |                                  | X                                 | 0.54                               |
| Hastings, C. S.   | Yale         | 73                          |                                | Yale                                  | 7                               |                                  |                                   | 0.35                               |
| Hazen, H. A.      | No           |                             |                                | U.S. Army Signal Corps                | 7                               | ME                               |                                   | 0.44                               |
| Holden, E. S.     | No           |                             |                                | Various Observatories; U.S. Navy      | 12                              | A                                |                                   | 0.60                               |
| Langley, S. P.    | No           |                             |                                | Smithsonian; Allegheny Observatory    | 20                              | A                                |                                   | 0.83                               |
| Lea, M. C.        | No           |                             |                                | Independent                           | 18                              | C                                |                                   | 0.75                               |
| Le Conte, John    | No           |                             |                                | Berkeley                              | 17                              |                                  |                                   | 0.74                               |
| Loomis, E.        | No           |                             |                                | Yale                                  | 21                              | ME                               |                                   | 1.05                               |
| Mayer, A. M.      | No           |                             |                                | Stevens Institute of Technology       | 41                              |                                  |                                   | 1.71                               |
| Mendenhall, T. C. | No           |                             |                                | U.S. Army Signal Corps; OSU;          | 10                              |                                  |                                   | 0.42                               |
|                   |              |                             |                                | USCGS                                 |                                 |                                  |                                   |                                    |
| Michelson, A. A.  | No           |                             | X                              | U. S. Navy; Case                      | 11                              |                                  |                                   | 0.46                               |
| Morley, E.        | No           |                             |                                | Western Reserve                       | 10                              |                                  |                                   | 0.42                               |
| Newton, H. A.     | No           |                             |                                | Yale                                  | 10                              |                                  |                                   | 0.42                               |

## APPENDIX I.

(Continued)

| <u>Name</u>      | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Total</u><br><u>Articles</u> | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1894-1915</u> | <u>Productivity</u><br><u>Rate</u> |
|------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|---------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| Nipher, F. E.    | No           |                             |                                | Washington University                 | 13                              |                                  |                                   | 0.68                               |
| Nichols, E. L.   | Goettingen   | 79                          | X                              | Cornell; Kansas                       | 15                              |                                  | X                                 | 1.07                               |
| Norton, W. A.    | Unlikely     |                             |                                | Yale                                  | 14                              |                                  |                                   | 0.61                               |
| Rockwood, C. G.  | Yale         | 66                          |                                | Bowdoin; Princeton                    | 12                              |                                  |                                   | 0.50                               |
| Rood, O. N.      | No           |                             |                                | Columbia                              | 24                              |                                  |                                   | 1.00                               |
| Rowland, H. A.   | No           |                             | X                              | Hopkins                               | 17                              |                                  |                                   | 0.94                               |
| Sherman, O. Y.   | Unlikely     |                             |                                | Yale                                  | 9                               |                                  |                                   | 0.75                               |
| Smith, J. L.     | No           |                             | X                              | Independent                           | 17                              |                                  |                                   | 1.31                               |
| Stevens, W. LeC. | Georgia      | 82                          | X                              | Cooper Institute; Packer College      | 14                              |                                  |                                   | 1.27                               |
|                  |              |                             |                                | Institute                             |                                 |                                  |                                   |                                    |
| Trowbridge, J.   | Harvard      | 73                          |                                | Harvard                               | 29                              |                                  |                                   | 1.45                               |
| Wright, A. W.    | Yale         | 61                          | X                              | Yale                                  | 17                              |                                  |                                   | 0.71                               |
| Young, C. A.     | No           |                             |                                | Dartmouth; Princeton                  | 22                              | A                                |                                   | 0.92                               |

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## APPENDIX II

## LESS PRODUCTIVE PHYSICISTS

Six or Fewer Articles

1870 - 1893

| <u>Name</u>     | <u>Place</u>           | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1894-1915</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> |
|-----------------|------------------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|----------------------------------|-----------------------------------|------------------------------------|---------------------------------|
| Abbe, C.        | No                     |                             | X                              | USWS                                  | 3                              | ME                               |                                   | 0.13                               |                                 |
| Abbot, H. A.    | Unlikely               |                             |                                | Corps of Engineers                    | 78                             | 1                                |                                   |                                    |                                 |
| Amory, H.       | Unlikely               |                             |                                | Harvard                               | 75                             | 1                                |                                   |                                    |                                 |
| Anthony, W. A.  | No                     |                             |                                | Cornell                               | 76                             | 1                                |                                   | 0.08                               |                                 |
| Barker, G. F.   | No (M.D.)              |                             |                                | Penn                                  | 3                              |                                  |                                   | 0.13                               |                                 |
| Bauer, L. A.    | Berlin                 | 95                          | X                              | USCGS                                 | 92                             | 1                                |                                   | 1.00                               |                                 |
| Beach, F. E.    | Yale                   | 93                          |                                | Yale                                  | 93                             | 1                                |                                   | 1.00                               |                                 |
| Bedell, F.      | Cornell                | 92                          |                                | Cornell                               | 92                             | 1                                |                                   | 1.00                               |                                 |
| Bell, Alex G.   | No                     |                             |                                | Washington, D.C.                      | 5                              |                                  |                                   | 0.26                               |                                 |
| Bell, C. J.     | Unlikely               |                             |                                | Harvard                               | 75                             | 1                                |                                   |                                    |                                 |
| Bell, Louis     | Hopkins                | 88                          |                                | Hopkins Fellow; Consulting Engineer   | 6                              |                                  |                                   | 1.20                               | X                               |
| Bigelow, F. H.  | No                     |                             |                                | Various Observatories                 | 6                              | ME                               |                                   | 0.46                               | X                               |
| Blake, E.       | Unlikely               |                             |                                | Brown                                 | 70, 78                         | 2                                |                                   |                                    |                                 |
| Blake, J. M.    | Unlikely               |                             |                                | New Haven                             | 74                             | 1                                |                                   |                                    |                                 |
| Boss, L.        | No                     |                             |                                | Dudley Observatory                    | 81                             | 1                                | A                                 | 0.05                               |                                 |
| Bostwick, A. E. | Yale                   | 83                          |                                | Yale; Montclair, NJ                   | 3                              |                                  |                                   | 0.30                               | X                               |
| Brackett, C. F. | No (M.D.)              |                             |                                | Princeton                             | 3                              |                                  |                                   | 0.13                               |                                 |
| Brewer, W.H.    | Washington & Jefferson | 80                          | X                              | Yale                                  | 85                             | 1                                | AG                                | 0.08                               |                                 |
| Brocklesby, J.  | Unlikely               |                             |                                | Trinity                               | 74                             | 1                                |                                   |                                    |                                 |
| Burnham, W.     | Unlikely               |                             |                                | Harvard                               | 74                             | 1                                |                                   |                                    |                                 |

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## APPENDIX II

(Continued)

| Name             | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                        | Articles<br>Year # | Principal<br>Field | Listed<br>1894-1915 | Productivity<br>Rate | High<br>Producers |
|------------------|------------|---------------|------------------|--|--------------------|--------------------|---------------------|----------------------|-------------------|
| Burton, B. S.    | Unlikely   |               |                  | University of East Tennessee                   | 76                 | 1                  |                     |                      |                   |
| Carmichael, H.   | Unlikely   |               |                  | Bowdoin  | 80                 | 1                  |                     |                      |                   |
| Carhart, H. S.   | No         |               | X                | Northwestern                                   |                    | 5                  | X                   | 0.25                 |                   |
| Carney, E. L.    | Unlikely   |               |                  | Harvard  | 74                 | 1                  |                     |                      |                   |
| Chatard, T. M.   | Heidelberg | 76            |                  | USGS   | 89                 | 1                  | C                   | 0.06                 |                   |
| Coffin, J. H.    | No         |               |                  | Lafayette College                              | 77                 | 1                  |                     |                      |                   |
| Colles, G. W.    | Unlikely   |               |                  |  | 93                 | 1                  |                     |                      |                   |
| Compton, A. G.   | No         |               |                  | CCNY   | 84                 | 1                  |                     | 0.04                 |                   |
| Cornstock, C. B. | No         |               |                  | U.S. Army                                      | 81                 | 1                  | G                   |                      |                   |
| Cornstock, W. J. | No         |               | X                | Hopkins; Yale                                  | 80                 | 1                  | C                   |                      |                   |
| Coöke, J. P.     | No         |               |                  | Harvard  |                    | 4                  | C                   | 0.16                 |                   |
| Cowles, A. H.    | No         |               |                  | Cowles Electric Smelting &<br>Aluminum Company | 85                 | 1                  | EN                  | 0.25                 |                   |
| Crew, H.         | Hopkins    | 87            |                  | Hopkins; Haverford                             | 88,89              | 2                  |                     | 0.33                 |                   |
| Curtis, G. E.    |            |               |                  |  | 87                 | 1                  |                     |                      |                   |
| Cutter, E.       | No (M.D.)  |               | X                | Physician                                      | 79,81              | 2                  |                     | 0.08                 |                   |
| Dana, E. S.      | Yale       | 76            | X                | Yale   | 74                 | 1                  | G                   | 0.06                 |                   |
| Derby, O. A.     | No         |               |                  | Brazil Geological Surveys                      | 82,91              | 2                  | G                   | 0.13                 |                   |
| Dolbear, A. E.   | No         |               |                  | Bethany College; Tufts                         | 72                 | 1                  |                     | 0.04                 |                   |
| Draper, J. C.    |            |               |                  | CCNY   |                    | 5                  |                     |                      |                   |
| Draper, J. W.    | No         |               |                  | NYU  |                    | 5                  |                     | 0.42                 | X                 |
| Duncan, L.       | Hopkins    | 85            |                  | Hopkins  | 89                 | 1                  |                     | 0.13                 |                   |
| Dutton, C. E.    | No         |               |                  | USGS (Army)                                    |                    | 4                  |                     | 0.16                 |                   |
| Edison, T. A.    | No         |               |                  | Menlo Park, N.J.                               |                    | 3                  |                     | 0.16                 |                   |
| Emerson, B. K.   | Goettingen | 69            | X                | Amherst  | 74                 | 1                  | G                   | 0.04                 |                   |
| Ferry, E. S.     | No         |               |                  | Cornell  | 92                 | 1                  |                     | 1.00                 |                   |

## APPENDIX II

(Continued)

| Name            | Place       | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment          | Articles<br>Year # | Principal<br>Field | Listed<br>1894-1915 | Productivity<br>Rate | High<br>Producers |
|-----------------|-------------|---------------|------------------|----------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Fewkes, J. W.   | Harvard     | 77            |                  | Harvard                          | 74                 | 2                  | ETH                 | 0.13                 |                   |
| Fine, H. B.     | Leipzig     | 85            | X                | Princeton                        | 81                 | 1                  | MA                  | 0.13                 |                   |
| Fletcher, L.    | Hopkins     | 81            |                  | Marlborough, New York            | 85                 | 1                  |                     | 0.08                 |                   |
| Franklin, W. S. | No          |               |                  | University of Kansas             |                    | 4                  | X                   | 2.00                 | X                 |
| Freeman, S. H.  |             |               |                  | Hopkins                          | 82                 | 1                  |                     |                      |                   |
| Fritts, C. E.   |             |               |                  | NYC                              | 83                 | 1                  |                     |                      |                   |
| Garver, M. M.   |             |               |                  | Mercerburg College, Pennsylvania | 78,80              | 2                  |                     |                      |                   |
| Geyer, W. E.    | Unlikely    |               |                  | Stevens Institute of Technology  | 72                 | 1                  |                     |                      |                   |
| Gibbs, O. W.    | No (M.D.)   |               | X                | Harvard                          | 70                 | 1                  | C                   | 0.04                 |                   |
| Gilbert, G. K.  | No          |               |                  | USGS                             |                    | 3                  | G                   | 0.14                 |                   |
| Goldmark, H.    | Unlikely    |               |                  | Harvard                          | 78                 | 1                  |                     |                      |                   |
| Gooch, F. A.    | Harvard     | 77            |                  | Yale; USGS                       | 91,92              | 2                  | C                   | 0.13                 |                   |
| Gould, B. A.    | Goettingen  | 48            |                  | Cordoba University               |                    | 6                  | A                   | 0.25                 |                   |
| Graham, J. C.   | No; Student | 93            |                  | Wesleyan                         | 93                 | 1                  | G                   | 1.00                 |                   |
| Grunow, W.      | Unlikely    |               |                  | Columbia                         | 74                 | 1                  |                     |                      |                   |
| Hale, G. E.     | No          |               | X                | MIT; Kenwood Observatory         | 91                 | 2                  | A                   | 2.00                 |                   |
| Hall, A.        | No          |               |                  | U.S. Navy                        | 71                 | 2                  | A                   | 0.08                 |                   |
| Hall, J. P.     | No          |               |                  | NYC - Newspapers                 | 93                 | 1                  | A                   | 0.06                 |                   |
| Hallock, W.     | Wurzburg    | 81            | X                | USGS                             |                    | 4                  |                     | 0.33                 | X                 |
| Harding, S. L.  | Unlikely    |               |                  | Harvard                          | 87                 | 1                  |                     |                      |                   |
| Hartness, W.    | No          |               |                  | U.S. Naval Observatory           |                    | 3                  | A                   | 0.12                 |                   |
| Hart, T. S.     | Unlikely    |               |                  |                                  | 91                 | 1                  |                     |                      |                   |
| Hawes, G. W.    | Unlikely    |               |                  | Washington, D.C.                 | 81                 | 1                  |                     |                      |                   |
| * Hayes, E.     | Unlikely    |               |                  | Wellesley                        | 85                 | 1                  |                     |                      |                   |
| Henry, Jos.     | No          |               |                  | Smithsonian                      | 71                 | 1                  |                     | 0.04                 |                   |
| Hidden, W. E.   | No          |               |                  | Mining                           | 80                 | 1                  | MI                  | 0.11                 |                   |



## APPENDIX II

(Continued)

| <u>Name</u>       | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>        | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1894-1915</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> |
|-------------------|--------------|-----------------------------|--------------------------------|--|---|----------------------------------|-----------------------------------|------------------------------------|---------------------------------|
| Hilgard, E. W.    | Heidelberg   | 53                          | X                              | Berkeley                                     | 74,81                                   | 2                                |                                   | 0.08                               |                                 |
| Hilgard, J. E.    | No           |                             |                                | USCGS  | 80                                      | 1                                | G                                 | 0.04                               |                                 |
| Hill, W. N.       | Unlikely     |                             |                                | Newport, Rhode Island                        | 80                                      | 1                                |                                   |                                    |                                 |
| Himes, C. F.      | No           |                             | X                              | Dickinson College                            | 74                                      | 1                                |                                   | 0.04                               |                                 |
| Hodges, N. D.     |              |                             |                                | Harvard                                      |   | 5                                |                                   |                                    |                                 |
| Holman, S. W.     | Unlikely     |                             |                                | MIT  | 82                                      | 1                                |                                   |                                    |                                 |
| Hungerford, E.    | Unlikely     |                             |                                |  | 82                                      | 1                                |                                   |                                    |                                 |
| Hunt, T. S.       | No           |                             | X                              | MIT; Consulting Geologist                    | 81                                      | 1                                | C                                 |                                    |                                 |
| Huntington, O. W. | Unlikely     |                             |                                |  | 70                                      | 1                                |                                   |                                    |                                 |
| Hurlbut, S. A.    |              |                             |                                | U.S. Minister to Columbia,<br>South America  |   |                                  |                                   |                                    |                                 |
| Hutchins, C. C.   |              |                             |                                | Harvard, Bowdoin                             |   | 6                                | X                                 |                                    |                                 |
| Ihlseng, M. G.    | Unlikely     |                             |                                | Columbia                                     | 79                                      | 1                                |                                   |                                    |                                 |
| Jacques, W. W.    | Hopkins      | 79                          |                                | Hopkins                                      | 79                                      | 1                                |                                   | 0.07                               |                                 |
| James, J. B.      | Unlikely     |                             |                                | Trenton, New Jersey                          | 70                                      | 1                                |                                   |                                    |                                 |
| Johnson, W. W.    | No           |                             |                                | Annapolis                                    | 72                                      | 1                                | MA                                | 0.04                               |                                 |
| Kennelly, A. E.   | No           |                             | X                              | Edison Laboratory                            | 88                                      | 1                                | X                                 | 0.25                               |                                 |
| Kerr, W. C.       | No           |                             |                                | USGS; North Carolina Geological<br>Survey    | 81                                      | 2                                |                                   | 0.12                               |                                 |
| Kimball, A. L.    | Hopkins      | 84                          |                                | Worcester Institute of Industrial<br>Science |   | 4                                |                                   | 0.44                               | X                               |
| King, Clarence    | No           |                             |                                |  | 93                                      | 1                                |                                   | 0.04                               |                                 |
| Kirkwood, Daniel  | No           |                             |                                | Indiana                                      |   | 3                                | A                                 | 0.12                               |                                 |
| Kirkwood, David   | Unlikely     |                             |                                | Indiana State                                | 65,71                                   | 2                                |                                   |                                    |                                 |
| Koyl, C. H.       | No           |                             |                                | Hopkins-fellow                               | 80                                      | 1                                |                                   | 0.14                               |                                 |
| Lane, N. C.       | Unlikely     |                             |                                | Michigan Mining School                       | 90                                      | 1                                |                                   |                                    |                                 |

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## APPENDIX II

(Continued)

| <u>Name</u>       | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1894-1915</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> |
|-------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|---|----------------------------------|-----------------------------------|------------------------------------|---------------------------------|
| Lane, J. H.       | Unlikely     |                             |                                | Washington, D.C.                      | 70                                      | 1                                |                                   |                                    |                                 |
| Langley, J. W.    | Michigan     | 89                          |                                | Ann Arbor                             | 84                                      | 2                                | C                                 | 0.50                               |                                 |
| Levison, W. G.    | No           |                             |                                | Cooper Union                          | 80                                      | 1                                | C                                 | 0.05                               |                                 |
| Lewis, H.         | Unlikely     |                             |                                | Germantown, Pennsylvania              | 80                                      | 1                                |                                   |                                    |                                 |
| Liebig, G. A.     | Hopkins      | 85                          |                                | Hopkins                               | 83                                      | 1                                |                                   |                                    |                                 |
| Linebarger, C. E. | No           |                             | X                              | Student Abroad                        |   | 4                                | X                                 | 4.00                               | X                               |
| Long, J. H.       | Tubingen     | 79                          |                                | Northwestern                          |   | 4                                | C                                 | 0.29                               |                                 |
| Loomis, F. E.     | Yale         | 66                          |                                |                                       | 70                                      | 1                                |                                   | 0.04                               |                                 |
| Lowery, W.        | No           |                             |                                | Lawyer                                | 74                                      | 1                                |                                   | 0.08                               |                                 |
| Magie, W. F.      | Berlin       | 85                          |                                | Princeton                             | 86                                      | 1                                | X                                 | 0.13                               |                                 |
| Mallet, J. W.     | Goettingen   | 52                          |                                | UVA                                   |   | 4                                | C                                 | 0.16                               |                                 |
| Martin, D. S.     | No           |                             |                                | Rutgers Female College                | 75                                      | 1                                | G                                 | 0.04                               |                                 |
| Mayer, A. G.      | Harvard      | 97                          |                                | Student Harvard                       | 93                                      | 1                                | Z                                 | 1.00                               |                                 |
| McFarland, R. W.  | Unlikely     |                             |                                | OSU                                   | 76,80                                   | 2                                |                                   |                                    |                                 |
| McGee, W. J.      | No           |                             |                                | USGS                                  |   | 4                                | G                                 | 0.33                               | X                               |
| Merritt, E.       | No           |                             | X                              | Cornell                               | 89,91                                   | 2                                | X                                 | 2.00                               |                                 |
| Minot, J. J.      | Unlikely     |                             |                                | Harvard                               | 74                                      | 1                                |                                   |                                    |                                 |
| * Mitchell, Maria |              |                             |                                | Vassar                                | 71,73                                   | 2                                | A                                 |                                    |                                 |
| Moler, G. S.      | No           |                             |                                | Cornell                               | 88                                      | 1                                |                                   | 0.07                               |                                 |
| Moreland, S. T.   | Unlikely     |                             |                                | Lexington, Virginia                   | 85,93                                   | 2                                |                                   |                                    |                                 |
| Morey, C. A.      | Unlikely     |                             |                                | MIT                                   | 74                                      | 1                                |                                   |                                    |                                 |
| Morse, W. R.      | Unlikely     |                             |                                | Harvard                               | 75                                      | 1                                |                                   |                                    |                                 |
| Munroe, C. E.     | No           |                             |                                | Annapolis                             | 88                                      | 1                                | C                                 | 0.06                               |                                 |
| Newcomb, S.       | No           |                             |                                | U.S. Navy (Almanac); Hopkins          |   | 5                                |                                   | 0.21                               |                                 |
| Norton, H.        | Unlikely     |                             |                                | Stevens Institute of Technology       | 71                                      | 2                                |                                   |                                    |                                 |
| Parkhurst, H. M.  | No           |                             |                                | New York City: Court Stenographer     | 70,75                                   | 2                                | A                                 | 0.08                               |                                 |

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## APPENDIX II

(Continued)

| Name              | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                     | Articles<br>Year # | Principal<br>Field | Listed<br>1894-1915 | Productivity<br>Rate | High<br>Producers |
|-------------------|----------|---------------|------------------|---|--------------------|--------------------|---------------------|----------------------|-------------------|
| Parsons, F. J.    | Unlikely |               |                  | Field Observatory                           | 84                 | 1                  |                     |                      |                   |
| Patterson, A. H.  | No       |               |                  | Harvard Student                             | 93                 | 1                  |                     | 1.00                 |                   |
| Peckham, S. F.    | No       |               |                  | Minnesota                                   | 80                 | 1                  | C                   | 0.04                 |                   |
| Peirce, B. O.     | Leipzig  | 79            | X                | Harvard                                     | 83,89              | 2                  |                     | 0.14                 |                   |
| Peirce, C. S.     | No       |               |                  | USCGS                                       |                    | 5                  |                     | 0.20                 |                   |
| Perkins, C. A.    | Hopkins  | 84            |                  | Bryn Mawr                                   | 85,90              | 2                  |                     | 0.22                 |                   |
| Peters, C. H. F.  | Berlin   |               | X                | Litchfield Observatory,<br>Hamilton College | 78,80              | 2                  | A                   | 0.09                 |                   |
| Phinney, J. I.    | No       |               |                  | Yale Student                                | 92                 | 1                  |                     | 1.00                 |                   |
| Pickering, E. C.  | No       |               |                  | Harvard; MIT                                |                    | 5                  | A                   | 0.40                 | X                 |
| Pickering, W. H.  | No       |               |                  | MIT   | 83                 | 1                  | A                   | 0.04                 |                   |
| Pliny, E. C.      | Unlikely |               |                  | Haverford                                   | 72,74              | 2                  |                     |                      |                   |
| Pratt, J. H.      | Yale     | 87            |                  | Cornell                                     | 88                 | 1                  |                     | 0.20                 |                   |
| Preston, E. D.    | No       |               | X                | USCGS                                       |                    | 4                  | G                   | 0.28                 |                   |
| Pulsifer, W. H.   | Unlikely |               |                  | St. Louis, Missouri                         | 79                 | 1                  |                     | 0.04                 |                   |
| Pupin, M. I.      | Berlin   | 89            | X                | Columbia                                    |                    | 5                  |                     | 1.25                 | X                 |
| Reid, H. F.       | Hopkins  | 85            |                  | Case  | 88                 | 1                  | G                   | 0.13                 |                   |
| Rogers, F. J.     | No       |               |                  | Cornell Student                             | 92                 | 1                  |                     | 0.05                 |                   |
| Rosa, E. B.       | Hopkins  | 91            |                  | Hopkins Student                             | 89                 | 1                  | X                   | 0.50                 |                   |
| Russell, T.       | Unlikely |               |                  | U.S. Lake Survey                            | 81,90              | 2                  | X                   |                      |                   |
| Rutherford, L. M. | No       |               | X                | Independent                                 | 72,76              | 2                  | A                   | 0.09                 |                   |
| Sabine, W. C.     | No       |               |                  | Harvard                                     | 89                 | 1                  |                     | 1.00                 |                   |
| Sampson, W. T.    | No       |               |                  | U.S. Navy - Annapolis                       | 78                 | 1                  |                     | 0.04                 |                   |
| Sawyer, E. F.     | No       |               |                  | Banker-Cambridge, Massachusetts             | 78,79              | 2                  | A                   | 0.13                 |                   |
| Schaeberle, J. M. | No       |               |                  | Michigan Observatory                        |                    | 3                  | A                   | 0.25                 |                   |
| Schott, C. A.     | No       |               |                  | USCGS                                       | 75,79              | 2                  | GD                  | 0.08                 |                   |

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## APPENDIX II

(Continued)

| Name              | Place                       | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment      | Articles<br>Year # | Principal<br>Field | Listed<br>1894-1915 | Productivity<br>Rate | High<br>Producers |
|-------------------|-----------------------------|---------------|------------------|------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Sears, David      | Unlikely                    |               |                  | Harvard                      | 74                 | 1                  |                     |                      |                   |
| Sharples, S. P.   | No                          |               |                  | Harvard                      | 71                 | 2                  | C                   | 0.08                 |                   |
| Shea, D. W.       | Berlin                      | 92            | X                | Harvard Student              | 88                 | 1                  | X                   | 1.00                 |                   |
| Sheldon, S.       | Wurzburg                    | 88            | X                | Brooklyn Polytech            | 90                 | 2                  | X                   | 0.40                 |                   |
| Shepard, C. U.    | No                          |               |                  | Amherst                      |                    | 6                  | MI                  | 0.38                 | X                 |
| Silliman, B.      | No                          |               |                  | Yale                         |                    | 5                  | C                   | 0.33                 | X                 |
| Silliman, J. M.   | Unlikely                    |               |                  | Lafayette College            | 70                 | 1                  |                     |                      |                   |
| Smock, J. C.      | No                          |               | X                | New Jersey Geological Survey | 83                 | 1                  | G                   | 0.04                 |                   |
| Spice, Robert     |                             |               |                  | Brooklyn                     | 76                 | 2                  |                     |                      |                   |
| Squier, G. O.     | Hopkins                     | 93            |                  | Hopkins                      | 93                 | 1                  |                     | 1.00                 |                   |
| Stimpson, F. E.   | Unlikely                    |               |                  |                              | 70                 | 1                  |                     |                      |                   |
| Stockwell, J. N.  | No                          |               |                  | Case; Private Study          | 79,85              | 2                  | A                   | 0.08                 |                   |
| Sutton, G.        | Unlikely                    |               |                  | Aurora, Indiana              | 73                 | 1                  |                     |                      |                   |
| Taylor, W. B.     | Unlikely                    |               |                  |                              | 76,85              | 2                  |                     |                      |                   |
| Thayer, A. S.     |                             |               |                  | Harvard                      | 74                 | 1                  |                     |                      |                   |
| Thompson, J. O.   | Strasburg                   | 91            | X                | Haverford                    | 92                 | 1                  | X                   | 0.50                 |                   |
| Thwing, C. B.     | Bonn                        | 94            | X                | Northwestern                 | 70                 | 1                  | X                   | 1.00                 |                   |
| Todd, D. P.       | Washington and<br>Jefferson | 88            |                  | Amherst; Nautical Almanac    | 80                 | 1                  | X                   | 0.20                 |                   |
| Trouvelot         |                             |               |                  | Harvard                      |                    | 5                  |                     |                      |                   |
| Trowbridge, W. P. | No                          |               |                  | Yale; Columbia               | 72                 | 1                  |                     | 0.04                 |                   |
| Twining, A. C.    | No                          |               |                  | New Haven                    | 71,72              | 2                  |                     | 0.14                 |                   |
| Upham, W.         | No                          |               |                  | USCGS                        | 93                 | 2                  | G                   | 0.12                 |                   |
| Waggener, W. J.   | Unlikely                    |               |                  |                              | 91                 | 1                  |                     |                      |                   |
| Waldo, F.         | Marietta                    | 89            |                  | U.S. Army Signal Corps       |                    | 3                  | ME                  | 0.38                 | X                 |
| Waldo, Leonard    | Harvard                     | 79            |                  | Yale College Observatory     |                    | 4                  |                     | 0.28                 |                   |

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## APPENDIX II

(Continued)

| Name            | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment       | Articles<br>Year # | Principal<br>Field | Listed<br>1894-1915 | Productivity<br>Rate | High<br>Producers |
|-----------------|------------|---------------|------------------|-------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Walton, E. M.   | Unlikely   |               |                  | MIT                           | 81                 | 1                  |                     |                      |                   |
| Warder, R. B.   | Unlikely   |               |                  | Haverford                     | 80                 | 1                  |                     |                      |                   |
| Wead, C. K.     | No         |               | X                | Michigan                      |                    | 5                  |                     | 0.29                 |                   |
| Weed, W. H.     | No         |               |                  | USGS                          | 89                 | 1                  | G                   | 0.33                 |                   |
| Wells, H. L.    | No         |               |                  | Yale                          | 91                 | 1                  | C                   | 0.10                 |                   |
| Whitmore, J.    | Yale       | 92            |                  |                               | 92                 | 1                  |                     |                      |                   |
| Whitney, A. W.  | No         |               |                  | Chicago Student               | 93                 | 1                  | MA                  | 1.00                 |                   |
| Wiley, H. W.    | Hanover    | 76            | X                | Purdue                        | 79                 | 1                  | C                   | 0.06                 |                   |
| Williet, J. E.  | Unlikely   |               |                  |                               | 70                 | 1                  |                     |                      |                   |
| Williams, G. H. | Heidelberg | 82            | X                | Hopkins                       | 80                 | 1                  | MI                  | 0.09                 |                   |
| Willis, B.      | No         |               |                  | USGS                          | 93                 | 1                  | G                   |                      |                   |
| Wilson, R.      |            |               |                  | Harvard                       |                    | 5                  |                     |                      |                   |
| Winchell, N. H. | No         |               |                  | State Geologist, Minnesota    | 81                 | 1                  | G                   | 0.04                 |                   |
| Woodward, J. J. | No         |               |                  | U.S. Surgeon General's Office |                    | 3                  | MED                 | 0.21                 |                   |
| Woodward, R. S. | No         |               |                  | USGS; USCGS                   |                    | 3                  |                     | 0.19                 |                   |
| Wurtz, H.       | No         |               |                  | Editor. Private               | 70                 | 1                  | C                   | 0.04                 |                   |

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## APPENDIX III

## PRODUCTIVE PHYSICISTS

Seven or More Articles

1894 - 1915

| Name                                | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                     | Total<br>Articles | Principal<br>Field | Listed<br>1870-1893 | Productivity<br>Rate |
|-------------------------------------|------------|---------------|------------------|---|-------------------|--------------------|---------------------|----------------------|
| Allen, S. J.                        | Hopkins    | 06            |                  | Cincinnati                                  | 8                 |                    |                     | 0.88                 |
| Barnett, S. J.                      | Cornell    | 98            |                  | Stanford; Tulane; OSU                       | 9                 |                    |                     | 0.53                 |
| Barus, C.                           | Wuerzburg  | 79            | X                | Brown                                       | 13                |                    |                     | 0.62                 |
| Brown, F. C.                        | Princeton  | 08            |                  | Iowa  | 14                |                    |                     | 2.00                 |
| Child, C. D.                        | Cornell    | 97            | X                | Colgate                                     | 21                |                    |                     | 1.17                 |
| Coblentz, W. W.                     | Cornell    | 03            |                  | Bureau of Standards                         | 16                |                    |                     | 1.33                 |
| Earhart, R. F.                      | Chicago    | 00            |                  | OSU   | 9                 |                    |                     | 0.60                 |
| Franklin, W. S.                     | Cornell    | 01            |                  | Lehigh                                      | 14                | EN                 | X                   | 1.00                 |
| Goodwin, H. M.                      | Leipzig    | 94            | X                | MIT   | 10                | C                  |                     | 0.48                 |
| Guthe, K. E.                        | Marburg    | 92            | X                | Iowa; Michigan                              | 8                 |                    |                     | 0.35                 |
| Hall, E. H.                         | Hopkins    | 80            |                  | Harvard                                     | 7                 |                    | X                   | 0.33                 |
| Hallett, G. A.                      | Leipzig    | 98            | X                | Michigan; Princeton                         | 9                 | C                  |                     | 0.53                 |
| Ives, H. E.                         | Hopkins    | 08            |                  | NELA; United Gas Improvement<br>Association | 11                |                    |                     | 1.57                 |
| Knipp, C. T.                        | Cornell    | 00            | X                | Indiana; Illinois                           | 10                |                    |                     | 0.67                 |
| Kunz, J.                            | Zurich     | 02            | X                | Michigan; Illinois                          | 9                 |                    |                     | 0.69                 |
| Magie, W. F.                        | Berlin     | 85            | X                | Princeton                                   | 8                 |                    | X                   | 0.38                 |
| Merritt, E.                         | No         |               | X                | Cornell                                     | 20 + 8            |                    | X                   | 1.27                 |
| Nichols, E. L.                      | Goettingen | 79            | X                | Kansas; Cornell                             | 20 + 16           |                    | X                   | 1.71                 |
| (Merritt, E. and<br>Nichols, E. L.) |            |               |                  |   | 20                |                    |                     |                      |
| Nichols, E. F.                      | Cornell    | 97            |                  | Colgate; Dartmouth; Columbia                | 10                |                    |                     | 0.56                 |

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## APPENDIX III

(Continued)

| Name            | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                  | Total<br>Articles | Principal<br>Field | Listed<br>1870-1893 | Productivity<br>Rate |
|-----------------|------------|---------------|------------------|--|-------------------|--------------------|---------------------|----------------------|
| Nutting, P. E.  | Cornell    | 03            | X                | Bureau of Standards; Eastman Kodak       | 8                 |                    |                     | 0.67                 |
| Pierce, G. W.   | Harvard    | 00            | X                | Harvard                                  | 10                |                    |                     | 0.67                 |
| Sanford, F.     | No         |               | X                | Stanford                                 | 14                |                    |                     | 0.67                 |
| Shedd, J. C.    | Wisconsin  | 99            |                  | Colorado College; Westminster;<br>Olivet | 10                |                    |                     | 0.63                 |
| Smith, A. W.    | Harvard    | 06            |                  | Haverford; Wisconsin; OSU                | 8                 |                    |                     | 0.89                 |
| Stewart, G. W.  | Cornell    | 01            |                  | North Dakota; Iowa                       | 11                |                    |                     | 0.79                 |
| Taylor, A. H.   | Goettingen | 09            | X                | Wisconsin; North Dakota                  | 13                |                    |                     | 2.17                 |
| Trowbridge, A.  | Berlin     | 97            | X                | Princeton                                | 7                 |                    |                     | 0.39                 |
| White, W. P.    | Cornell    | 04            |                  | Carnegie Institution                     | 13                |                    |                     | 1.18                 |
| * Wick, F. G.   | Cornell    | 08            |                  | Simmons; Vassar                          | 8                 |                    |                     | 1.14                 |
| Williams, S. R. | Columbia   | 06            | X                | Oberlin                                  | 9                 |                    |                     | 1.00                 |
| Wood, R. W.     | No         |               | X                | Hopkins                                  | 8                 |                    |                     | 0.42                 |
| Zeleny, A.      | Minnesota  | 07            | X                | Minnesota                                | 8 $\frac{1}{2}$   |                    |                     | 1.21                 |
| Zeleny, J.      | Minnesota  | 06            | X                | Minnesota                                | 8 $\frac{1}{2}$   |                    |                     | 1.61                 |

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## APPENDIX IV

## LESS PRODUCTIVE PHYSICISTS

Six or Fewer Articles

1894 - 1915

| Name             | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                        | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|------------------|-----------|---------------|------------------|--|--------------------|--------------------|----------------------|-------------------|---------------------|
| Adams, C. F.     | No        |               |                  | MIT  | 1                  | EN                 | 0.05                 |                   |                     |
| Adams, E. P.     | Harvard   | 04            |                  | Princeton                                      | 3                  |                    | 0.27                 |                   |                     |
| Agnew, P. G.     | Hopkins   | 11            |                  | Bureau of Standards                            | 1                  |                    | 0.25                 |                   |                     |
| Allen, F.        | Cornell   | 02            |                  | Manitoba                                       | 4                  |                    | 0.31                 |                   |                     |
| Allen, F. A.     |           |               |                  |  | 1                  |                    |                      |                   |                     |
| Almy, J. E.      | Berlin    | 00            | X                | Nebraska                                       | 1                  |                    | 0.07                 |                   |                     |
| Anderson, S. H.  | Illinois  | 12            |                  | Occidental; Washington (Seattle)               | 4                  |                    | 1.33                 | X                 |                     |
| Angell, M. F.    | Wisconsin | 11            |                  | New Mexico                                     | 11                 | EN                 | 0.25                 |                   |                     |
| Angstrom, A. K.  |           |               |                  |  | 6                  |                    |                      |                   |                     |
| Arakawa, B.      |           |               |                  |  | 1                  |                    |                      |                   |                     |
| Atkins, M. D.    |           |               |                  |  | 2                  |                    |                      |                   |                     |
| Atwater, W. O.   | Yale      | 69            | X                | USDA   | 2                  | C                  | 0.15                 |                   |                     |
| Austin, L. W.    | Strasburg | 93            | X                | Bureau of Standards                            | 6                  |                    | 0.27                 |                   |                     |
| Ayres, H. D.     | Cornell   | 13            |                  | Carnegie Institution; B.F. Goodrich<br>Company | 3                  |                    | 1.50                 | X                 |                     |
| Bacon, A. A.     | No        |               |                  | Hobart   | 1                  |                    | 0.08                 |                   |                     |
| Bailey, B. F.    | Michigan  | 07            |                  | Michigan                                       | 1                  | EN                 | 0.13                 |                   |                     |
| Bailey, F. K.    |           |               |                  |  | 1                  |                    |                      |                   |                     |
| Baker, W. C.     | No        |               |                  | Queens (Canada)                                | 5                  |                    | 0.31                 |                   |                     |
| Bakker, G.       |           |               |                  |  | 1                  |                    |                      |                   |                     |
| * Baldwin, C. W. |           |               |                  |  | 2                  |                    |                      |                   |                     |

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## APPENDIX X

(Continued)

| Name           | Place      | Ph. D.<br>Year | Foreign<br>Study | Principal<br>Employment       | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|----------------|------------|----------------|------------------|-------------------------------|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Headden, W. P. | Glessen    | 74             | X                | Colorado Agricultural College | 85                 | 1                   | 0.08                 |                   | 1 |   |   |
| Hecht, J. L.   |            |                |                  |                               | 90                 | 1                   |                      |                   | 1 |   |   |
| Hedrick, W. A. |            |                |                  |                               | 87                 | 1                   |                      |                   | 1 |   |   |
| Hill, H. V.    |            |                |                  |                               | 84, 87             | 2                   |                      |                   | 2 |   |   |
| Hitchcock, R.  | No         |                |                  | Independent                   | 89, 91             | 2                   | 0.16                 |                   | 2 |   |   |
| Holmes, J. H.  |            |                |                  |                               | 91                 | 1                   |                      |                   | 1 |   |   |
| Holton, F. A.  |            |                |                  |                               | 85                 | 1                   |                      |                   |   | 1 |   |
| Howe, J. L.    | Berlin     | 82             | X                | Washington & Lee              | 83                 | 1                   | 0.11                 |                   | 1 |   |   |
|                | Goettingen | 82             | X                |                               |                    |                     |                      |                   |   |   |   |
|                | MIT        | 94             |                  |                               |                    |                     |                      |                   |   |   |   |
| Hunt, T. S.    |            |                |                  |                               | 88, 90             | 2                   |                      |                   | 2 |   |   |
| Hurff, G. B.   |            |                |                  |                               | 82                 | 1                   |                      |                   | 1 |   |   |
| Iles, M. W.    |            |                |                  |                               | 81, 82             | 2                   |                      |                   |   | 2 |   |
| Japp, F. R.    |            |                |                  |                               | 85                 | 1                   |                      |                   | 1 |   |   |
| Jarman, J. L.  |            |                |                  |                               | 89                 | 2                   |                      |                   |   | 2 |   |
| Jenkins, E. H. |            |                |                  |                               | 79, 80             | 2                   |                      |                   |   | 2 |   |
| Jewett, J.     |            |                |                  |                               | 79                 | 1                   |                      |                   | 1 |   |   |
| Johnson, S. W. | No         |                | X                | Yale                          |                    | 3                   | 0.25                 |                   |   | 2 | 1 |
| Joslin, O. T.  |            |                |                  |                               | 83                 | 1                   |                      |                   | 1 |   |   |
| Julien, A.     | No         |                |                  | Columbia                      | 81                 | 1                   | 0.08                 |                   | 1 |   |   |
| Kastie, J. H.  | Hopkins    | 88             |                  | Ky State                      | 89                 | 1                   | 0.33                 |                   | 1 |   |   |
| Kehler, J. T.  |            |                |                  |                               | 88                 | 1                   |                      |                   | 1 |   |   |
| Kent, W. H.    |            |                |                  |                               | 88                 | 1                   |                      |                   |   | 1 |   |
| Kolbe, H.      |            |                |                  |                               | 79                 | 1                   |                      |                   |   |   |   |
| Konig, G. A.   |            |                |                  | Penn                          | 80                 | 2                   |                      |                   | 2 |   |   |
| Kopp, A.       |            |                |                  |                               | 83                 | 1                   |                      |                   | 1 |   |   |

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## APPENDIX X

(Continued)

| Name            | Place      | Ph. D.<br>Year | Foreign<br>Study | Principal<br>Employment                         | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-----------------|------------|----------------|------------------|---|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Kruss, G.       |            |                |                  |   | 89                 | 1                   |                      |                   | 1 |   |   |
| Kuhne, W.       |            |                |                  |   | 84                 | 2                   |                      |                   |   | 2 |   |
| Laist, A.       |            |                |                  |   | 88                 | 1                   |                      |                   | 1 |   |   |
| Lambert, S. W.  |            |                |                  |   | 82                 | 1                   |                      |                   |   | 1 |   |
| Lawler, C. J.   |            |                |                  |   | 83                 | 1                   |                      |                   | 1 |   |   |
| LeBel, J. A.    |            |                |                  |   | 80                 | 1                   |                      |                   | 1 |   |   |
| Lehmann, G. W.  | No         |                | X                | U. S. Government                                | 85                 | 1                   | 0.08                 |                   |   | 1 |   |
| Lengfield, F.   | Hopkins    | 88             | X                | Chicago; Independent                            | 89                 | 1                   | 0.33                 |                   | 1 |   |   |
| Lewis, D. S.    |            |                |                  |   | 83                 | 1                   |                      |                   |   | 1 |   |
| Lieben, A.      |            |                |                  |   | 79                 | 1                   |                      |                   | 1 |   |   |
| Liebschutz, M.  |            |                |                  |   | 85                 | 2                   |                      |                   | 1 | 1 |   |
| * Lloyd, R.     |            |                |                  |   |                    | 3                   |                      |                   | 3 |   |   |
| Loeb, M.        | Berlin     | 87             | X                | NYU   | 90, 91             | 2                   | 0.25                 |                   | 1 | 1 |   |
| Long, J. H.     | Tubingen   | 79             | X                | Northwestern; Illinois State<br>Board of Health | 88, 89             | 3                   | 0.25                 |                   | 2 |   | 1 |
| Lowery, W.      |            |                |                  |   | 81                 | 1                   |                      |                   | 1 |   |   |
| Luedcking, C.   |            |                |                  |   | 86, 91             | 2                   |                      |                   | 1 |   | 1 |
| Lupton, N. T.   |            |                |                  |   | 91                 | 1                   |                      |                   |   | 1 |   |
| McCarter, H. G. |            |                |                  |   | 79                 | 1                   |                      |                   | 1 |   |   |
| McKelvey, J. W. |            |                |                  | Rutgers   | 84                 | 1                   |                      |                   | 1 |   |   |
| Mahon, R. W.    |            |                |                  |   | 82                 | 3                   |                      |                   | 3 |   |   |
| Mandel, J. A.   | NYU        | 01             | X                | Bellevue Hospital Medical College               | 91                 | 1                   | 0.08                 |                   |   | 1 |   |
| Manning, L. H.  |            |                |                  |   | 88                 | 2                   |                      |                   | 2 |   |   |
| Marsh, C. W.    |            |                |                  |   | 82, 89             | 2                   |                      |                   | 1 | 1 |   |
| Marshall, J.    | Tubingen   | 82             | X                | Penn  | 88                 | 1                   | 0.14                 |                   |   | 1 |   |
|                 | Christiana | 86             |                  |   |                    |                     |                      |                   |   |   |   |
| Mason, W. P.    | No         |                | X                | RPI   | 87                 | 2                   | 0.20                 |                   |   |   | 2 |

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(Continued)

| Name             | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                         | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|------------------|----------|---------------|------------------|---|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Meier, F. R.     |          |               |                  |   | 80                 | 1                   |                      |                   | 1 |   |   |
| Melville, W. H.  |          |               |                  | Harvard   | 82                 | 2                   |                      |                   | 2 |   |   |
| Menninger, C. G. |          |               |                  |   | 85                 | 2                   |                      |                   | 2 |   |   |
| Meyer, C.        |          |               |                  |   | 79                 | 1                   |                      |                   | 1 |   |   |
| Meyer, L.        |          |               |                  |   | 79, 85             | 3                   |                      |                   | 3 |   |   |
| Meyer, V.        |          |               |                  |   | 79                 | 1                   |                      |                   | 1 |   |   |
| Michaud, G.      | Geneva   | 86            | X                | Liceo de Costa Rica; French<br>American College | 91                 | 1                   | 0.20                 |                   | 1 |   |   |
| Miles, F. P.     |          |               |                  |   | 86                 | 2                   |                      |                   | 2 |   |   |
| Mohr, F.         |          |               |                  |   | 79                 | 1                   |                      |                   | 1 |   |   |
| Moissau, H.      |          |               |                  |   | 79                 | 1                   |                      |                   | 1 |   |   |
| Moore, R. W.     |          |               |                  |   | 85, 89             | 3                   |                      |                   |   | 3 |   |
| Morgan, T. M.    |          |               |                  |   | 90                 | 1                   |                      |                   |   | 1 |   |
| Morrell, T. T.   |          |               |                  |   | 80                 | 2                   |                      |                   | 2 |   |   |
| Morse, W. H.     |          |               |                  |   | 90                 | 1                   |                      |                   | 1 |   |   |
| Morton, H.       |          |               |                  | SIT   | 79                 | 3                   |                      |                   | 3 |   |   |
| Moulton, C. W.   | Hopkins  | 89            |                  | Vassar  | 91                 | 1                   | 0.50                 |                   | 1 |   |   |
| Munroe, C. E.    | No       |               |                  | U.S. Navy; George Washington                    | 90, 91             | 2                   | 0.15                 |                   |   | 2 |   |
| Munsell, C. E.   |          |               |                  |   | 3                  |                     |                      |                   | 1 | 2 |   |
| Nernst, W.       |          |               |                  |   | 89                 | 1                   |                      |                   | 1 |   |   |
| Nicholson, H. H. | No       |               | X                | Nebraska  | 84                 | 1                   | 0.08                 |                   | 1 |   |   |
| Novy, F. G.      | Michigan | 90            | X                | Michigan  | 88                 | 1                   | 1.00                 |                   | 1 |   |   |
| O'Neill, E. C.   | No       |               | X                | California                                      | 82                 | 1                   | 0.20                 |                   |   |   | 1 |
| Otto, R.         |          |               |                  |   | 79                 | 1                   |                      |                   | 1 |   |   |
| Owen, F. H.      |          |               |                  |   | 88, 91             | 2                   |                      |                   |   | 2 |   |
| * Owens, M. E.   |          |               |                  | University of Cincinnati                        | 3                  |                     |                      |                   | 3 |   |   |

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## APPENDIX X

(Continued)

| Name             | Place          | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment   | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|------------------|----------------|---------------|------------------|---|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Palmer, A. W.    |                |               |                  |   | 89                 | 1                   |                      |                   | 1 |   |   |
| Palmer, C.       | Hopkins        | 82            |                  | State Normal School,<br>Massachusetts; Manual Training<br>High School, Kentucky | 82, 89             | 3                   | 0.33                 |                   | 3 |   |   |
| Palmer, G. M.    |                |               | X                |   | 84                 | 1                   |                      |                   | 1 |   |   |
| Parr, S. W.      | No             |               |                  | Illinois  | 85                 | 1                   | 0.16                 |                   |   | 1 |   |
| Parsons, C. L.   | No             |               |                  | New Hampshire College of<br>Agricultural & Mechanical Arts                      | 88                 | 1                   | 1.00                 |                   |   |   | 1 |
| Parsons, H. B.   |                |               |                  |   | 79, 82             | 2                   |                      |                   | 1 | 1 |   |
| Patterson, H. J. | No             |               |                  | Maryland Agricultural Experimental<br>Station                                   | 90                 | 1                   | 1.00                 |                   |   | 1 |   |
| Patterson, L. G. |                |               |                  |   | 85                 | 1                   |                      |                   | 1 |   |   |
| Penfield, S.     | No             |               | X                | Yale  | 79                 | 1                   | 0.14                 |                   | 1 |   |   |
| Perry, N. W.     |                |               |                  |   | 82                 | 1                   |                      |                   | 1 |   |   |
| Phillips, W. B.  | North Carolina | 83            | X                | Independent   | 84                 | 2                   | 0.25                 |                   |   | 2 |   |
| * Pierce, G.     |                |               |                  |   | 79                 | 1                   |                      |                   | 1 |   |   |
| Pomeroy, C. T.   |                |               |                  |   | 83                 | 1                   |                      |                   |   | 1 |   |
| Pool, F. V.      |                |               |                  |   | 85                 | 1                   |                      |                   | 1 |   |   |
| Prescott, A. B.  |                |               |                  | Michigan  | 80                 | 3                   | 0.25                 |                   | 1 | 1 | 1 |
| Prescott, C. O.  |                |               |                  |   | 84                 | 1                   |                      |                   | 1 |   |   |
| Price, R. C.     |                |               |                  |   | 88                 | 1                   |                      |                   | 1 |   |   |
| Prochazka, G. A. |                |               |                  |   | 79                 | 3                   |                      |                   | 1 | 2 |   |
| Radcliffe, T.    |                |               |                  | North Carolina  | 82                 | 1                   |                      |                   | 1 |   |   |
| Raht, A.         |                |               |                  |   | 79                 | 1                   |                      |                   |   | 1 |   |
| Randall, W. W.   |                |               |                  |   | 91                 | 1                   |                      |                   | 1 |   |   |
| Rau, H.          |                |               |                  |   | 85, 87             | 2                   |                      |                   |   | 2 |   |

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## APPENDIX X

(Continued)

| Name               | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|--------------------|------------|---------------|------------------|--|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Richards, T. H.    |            |               |                  |  | 88                 | 2                   |                      |                   | 2 |   |   |
| Richmond, W. T.    |            |               |                  |  | 83                 | 1                   |                      |                   | 1 |   |   |
| Ricketts, P. de P. | Unknown    |               |                  | Columbia; Independent  | 79                 | 1                   | 0.08                 |                   |   | 1 |   |
| Robinson, F. C.    | No         |               |                  | Bowdoin  | 82, 83             | 2                   | 0.18                 |                   | 2 |   |   |
| Rossi, A. J.       |            |               |                  |  | 90                 | 3                   |                      |                   |   | 3 |   |
| Rowland, Wm. L.    |            |               |                  |  | 81                 | 1                   |                      |                   | 1 |   |   |
| Sabin, A. H.       | No         |               |                  | Industry   | 90                 | 1                   | 0.09                 |                   |   | 1 |   |
| Sadtler, B.J., Jr. |            |               |                  |  | 83                 | 1                   |                      |                   | 1 |   |   |
| Sadtler, S. P.     | Goettingen | 71            | X                | Penn; Philadelphia College<br>Pharmacy                                     | 79, 81             | 2                   | 0.25                 |                   | 1 |   | 1 |
| Sands, F.          |            |               |                  |  | 82                 | 1                   |                      |                   | 1 |   |   |
| Sanger, C. R.      | Harvard    | 84            |                  | U.S. Naval Academy; Harvard  | 91                 | 1                   | 0.14                 |                   |   | 1 |   |
| Saunders, C. E.    | Hopkins    | 91            | X                | Central University of Kentucky;<br>Government Experimental Farm,<br>Canada | 91                 | 1                   | 1.00                 |                   | 1 |   |   |
| Schening, E.       |            |               |                  |  | 79                 | 1                   |                      |                   | 1 |   |   |
| Schmidt, H.        |            |               |                  |  | 86                 | 1                   |                      |                   | 1 |   |   |
| Schoonmaker, W.D.  |            |               |                  | Rutgers  | 81                 | 1                   |                      |                   | 1 |   |   |
| Schorlemmer, C.    |            |               |                  |  | 84                 | 1                   |                      |                   | 1 |   |   |
| Scovell, M. A.     | No         |               |                  | Kentucky Agricultural Experimental<br>Station                              | 87                 | 1                   | 0.13                 |                   |   | 1 |   |
| Shimer, P. W.      | Lafayette  | 99            |                  | Drown Chemical Laboratory  | 82                 | 1                   | 0.16                 |                   |   | 1 |   |
| Short, F. G.       |            |               |                  |  | 87                 | 1                   |                      |                   | 1 |   |   |
| Siegfried, C. A.   |            |               |                  | U.S. Navy Surgeon  | 90                 | 1                   |                      |                   |   |   | 1 |
| Sloane, T. O'C.    | Columbia   | 72            |                  | Seton Hall; Inventor   | 81, 91             | 2                   | 0.16                 |                   | 2 |   |   |
| Slooten, Wm. V.    |            |               |                  |  | 79                 | 1                   |                      |                   |   | 1 |   |

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(Continued)

| Name             | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|------------------|------------|---------------|------------------|-------------------------|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Smith, E.        | Goettingen | 83            | X                | Beloit                  | 84                 | 1                   | 0.13                 |                   | 1 |   |   |
| Smith, F.        |            |               |                  | Rutgers                 | 84                 | 1                   |                      |                   | 1 |   |   |
| Smith, H. E.     | M.D.       |               |                  | Yale                    | 84                 | 1                   | 1.00                 |                   |   |   | 1 |
| Smith, J. L.     |            |               |                  |                         | 83                 | 2                   |                      |                   | 2 |   |   |
| Snyder, H.       |            |               |                  |                         | 91                 | 1                   |                      |                   |   | 1 |   |
| Speyers, C. L.   | No         |               |                  | Missouri                | 90, 91             | 2                   | 2.00                 |                   | 2 |   |   |
| Springer, A.     | Heidelberg | 72            | X                | Alex Fries & Bros.      | 79, 83             | 2                   | 0.16                 |                   | 1 |   | 1 |
| * Stallo, H. U.  |            |               |                  |                         | 80                 | 1                   |                      |                   | 1 |   |   |
| Stern, D.        |            |               |                  |                         | 81                 | 1                   |                      |                   | 1 |   |   |
| Stevens, E. K.   |            |               |                  |                         | 84                 | 1                   |                      |                   | 1 |   |   |
| Stillman, J. M.  | Berkeley   | 85            | X                | Sugar Refining Company  | 80, 82             | 3                   | 0.50                 |                   |   | 2 | 1 |
| Stilwell, A. G.  |            |               |                  |                         | 82                 | 1                   |                      |                   | 1 |   |   |
| Stilwell, C. M.  |            |               |                  |                         | 86                 | 1                   |                      |                   | 1 |   |   |
| Stoddard, J. T.  | Goettingen | 77            | X                | Smith                   | 82, 83             | 2                   | 0.16                 |                   | 2 |   |   |
| Stokes, H. N.    | Hopkins    | 84            | X                | USGS                    |                    | 3                   | 0.43                 |                   | 3 |   |   |
| Stone, G. C.     |            |               |                  |                         | 82                 | 1                   |                      |                   | 1 |   |   |
| Stone, W. E.     | Goettingen | 88            | X                | Purdue                  | 90, 91             | 3                   | 3.00                 |                   | 1 | 2 |   |
| Storer, F. H.    | No         |               | X                | Harvard                 | 83                 | 2                   | 0.16                 |                   |   | 2 |   |
| Sutton, F. S.    |            |               |                  |                         | 85                 | 1                   |                      |                   |   |   | 1 |
| Sweetser, R. C.  |            |               |                  |                         | 85                 | 1                   |                      |                   | 1 |   |   |
| Tenney, F.       |            |               |                  | MIT                     | 83                 | 1                   |                      |                   | 1 |   |   |
| Thomas, N. W.    |            |               |                  | Muhlenberg College      | 83                 | 3                   |                      |                   | 1 | 2 |   |
| Thorpe, T. E.    |            |               |                  |                         | 84                 | 1                   |                      |                   | 1 |   |   |
| Tscherniac, J.   |            |               |                  |                         | 83                 | 1                   |                      |                   | 1 |   |   |
| Tucker, J. H.    |            |               |                  |                         | 81                 | 1                   |                      |                   | 1 |   |   |
| Valentini, E. P. |            |               |                  |                         | 85                 | 1                   |                      |                   | 1 |   |   |

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(Continued)

| <u>Name</u>       | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>                                 | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Listed</u><br><u>1892-1914</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>P</u> | <u>A</u> | <u>M</u> |
|-------------------|--------------|-----------------------------|--------------------------------|---|---|-----------------------------------|------------------------------------|---------------------------------|----------|----------|----------|
| Van Mater, J. A.  |              |                             |                                | Rutgers   | 81                                      | 1                                 |                                    |                                 | 1        |          |          |
| Van Nuys, T. C.   |              |                             |                                |   | 87, 90                                  | 2                                 |                                    |                                 |          | 1        | 1        |
| Van Slyke, L. L.  | Michigan     | 82                          |                                | Michigan; Oahu College; New York<br>Agricultural Experimental Station | 91                                      | 1                                 | 0.11                               |                                 |          | 1        |          |
| Von Herff, B.     |              |                             |                                |   | 84                                      | 1                                 |                                    |                                 |          | 1        |          |
| Waddell, J.       | Heidelberg   | 84                          | X                              | Royal Military College, Canada  | 86                                      | 1                                 | 0.14                               |                                 | 1        |          |          |
| Wainwright, J. H. |              |                             |                                |   | 85, 89                                  | 2                                 |                                    |                                 |          | 1        | 1        |
| Wait, C. E.       | Missouri     | 88                          |                                | Missouri School of Mines;<br>Tennessee                                | 79, 82                                  | 2                                 | 0.66                               |                                 | 2        |          |          |
| Wakeman, A. J.    | Leipzig      | 94                          | X                              | MIT   | 87                                      | 1                                 | 1.00                               |                                 | 1        |          |          |
| Waik, W.          |              |                             |                                |   | 90                                      | 1                                 |                                    |                                 |          | 1        |          |
| Walker, P. H.     |              |                             |                                |   | 88                                      | 1                                 |                                    |                                 | 1        |          |          |
| Weber, H. C.      |              |                             |                                |   | 82                                      | 1                                 |                                    |                                 | 1        |          |          |
| Weid, F. C.       |              |                             |                                |   | 91                                      | 1                                 |                                    |                                 |          | 1        |          |
| Weid, H. W.       |              |                             |                                |   | 88                                      | 1                                 |                                    |                                 | 1        |          |          |
| White, J. Fleming |              |                             |                                |   | 80, 81                                  | 2                                 |                                    |                                 | 2        |          |          |
| Whitfield, J. E.  | No           |                             |                                | USGS  | 86                                      | 1                                 | 0.25                               |                                 | 1        |          |          |
| Wilber, F. A.     |              |                             |                                | Rutgers   | 82, 83                                  | 2                                 |                                    |                                 | 2        |          |          |
| Wilkes, J. F.     |              |                             |                                |   | 84                                      | 1                                 |                                    |                                 |          | 1        |          |
| Willard, J. T.    | No           |                             |                                | Kansas State Agricultural College<br>and Experimental Station         | 88                                      | 1                                 | 1.00                               |                                 |          | 1        |          |
| Williams, G. H.   |              |                             |                                |   | 89                                      | 1                                 |                                    |                                 | 1        |          |          |
| Williams, S. W.   |              |                             |                                |   | 89                                      | 1                                 |                                    |                                 | 1        |          |          |
| Wing, J. F.       |              |                             |                                |   | 85                                      | 1                                 |                                    |                                 | 1        |          |          |
| Woll, F. W.       | No           |                             | X                              | Wisconsin Agricultural Experimental<br>Station                        | 87                                      | 1                                 | 1.00                               |                                 |          | 1        |          |

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| <u>Name</u>   | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>              | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Listed</u><br><u>1892-1914</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>P</u> | <u>A</u> | <u>M</u> |
|---------------|--------------|-----------------------------|--------------------------------|--|---|-----------------------------------|------------------------------------|---------------------------------|----------|----------|----------|
| Wood, J.      |              |                             |                                |  | 84                                      | 1                                 |                                    |                                 | 1        |          |          |
| Woodman, D.   | Stevens      | 87                          | X                              | U.S. Electric Light Company;<br>Consulting Chemist | 89, 91                                  | 2                                 | 0.50                               |                                 |          | 1        | 1        |
| Young, A.V.E. | No           |                             |                                | Michigan; Harvard; Northwestern                    | 86                                      | 1                                 | 0.10                               |                                 | 1        |          |          |

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## APPENDIX XI

## PRODUCTIVE CHEMISTS

Eight or More Articles

1892 - 1914

| Name            | Place          | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Total<br>Articles | Principal<br>Field | Listed<br>1879-1891 | Productivity<br>Rate | P  | A  | M |
|-----------------|----------------|---------------|------------------|--|-------------------|--------------------|---------------------|----------------------|----|----|---|
| Alway, F. J.    | Heidelberg     | 97            | X                | Nebraska; Wesleyan   | 8                 |                    |                     | 0.47                 | 2  | 6  |   |
| Andrews, L.     | Goettingen     | 82            | X                | Iowa State University; Mallinckrodt<br>Chemical Works  | 12                |                    |                     | 0.52                 | 8  | 4  |   |
| Auchy, G.       | No             |               |                  | Industry   | 18                |                    |                     | 0.78                 | 1  | 17 |   |
| Avery, S.       | Heidelberg     | 96            | X                | Nebraska   | 10                |                    |                     | 0.56                 | 4  | 6  |   |
| Baskerville, C. | Berlin         | 93            | X                | North Carolina; CCNY   | 35                |                    |                     | 1.75                 | 20 | 15 |   |
| Baxter, G. P.   | North Carolina | 94            |                  |  |                   |                    |                     |                      |    |    |   |
| Bigelow, W. D.  | Harvard        | 99            |                  | Harvard  | 31                |                    |                     | 2.07                 | 31 |    |   |
| Bogert, M. T.   | No             |               |                  | USDA; National University  | 10                |                    |                     | 0.50                 |    | 8  | 2 |
| Bray, W. C.     | No             |               |                  | Columbia   | 46                |                    |                     | 4.60                 | 46 |    |   |
| Browne, A. W.   | Leipzig        | 05            | X                | MIT; Berkeley  | 12                |                    |                     | 1.33                 | 12 |    |   |
| Browne, C. A.   | Cornell        | 03            |                  | Cornell  | 12                |                    |                     | 1.09                 | 12 |    |   |
|                 | Goettingen     | 01            | X                | Louisiana Sugar Experimental Station;<br>Pennsylvania Experimental Station;<br>New York Sugar Trade Laboratory | 12                |                    |                     | 0.92                 |    | 12 |   |
| Byers, H. G.    | Hopkins        | 99            | X                | Washington (Seattle)   | 8                 |                    |                     | 0.53                 | 5  | 3  |   |
| Cain, J. R.     |                |               |                  | Bureau of Standards  | 10                |                    |                     |                      | 1  | 9  |   |
| Cameron, F. K.  | Hopkins        | 94            |                  | Bureau of Soils; USDA  | 12                |                    |                     | 0.60                 |    | 12 |   |
| Campbell, E. D. | No             |               |                  | Michigan   | 23                |                    |                     | 1.00                 | 1  | 22 |   |
| Campbell, G. F. |                |               |                  |  | 11                |                    |                     |                      |    | 7  | 4 |
| Clarke, L.      |                |               |                  | Harvard  | 15                |                    |                     |                      | 15 |    |   |
| Cochran, C. B.  | No             |               |                  | Pennsylvania State Department of<br>Agriculture  | 8                 |                    |                     | 0.35                 |    | 8  |   |

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(Continued)

| Name               | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Total<br>Articles | Principal<br>Field | Listed<br>1879-1891 | Productivity<br>Rate | P  | A  | M  |
|--------------------|------------|---------------|------------------|--|-------------------|--------------------|---------------------|----------------------|----|----|----|
| Curtiss, R. S.     | Wurzburg   | 92            | X                | Illinois   | 8                 |                    |                     | 0.36                 | 8  |    |    |
| Cartmann, L. J.    | Columbia   | 07            |                  | CCNY   | 9                 |                    |                     | 1.28                 | 9  |    |    |
| Dehn, Wm. M.       | Illinois   | 03            |                  | University of Illinois; Washington<br>(Seattle)                        | 19                |                    |                     | 1.73                 | 16 |    | 3  |
| Dennis, L. M.      | No         |               | X                | Cornell  | 19                |                    |                     | 0.83                 | 14 | 5  |    |
| Derick, C. G.      | MIT        | 10            |                  | Illinois   | 10                |                    |                     | 2.50                 | 10 |    |    |
| Dewey, F. P.       | No         |               |                  | Mint Bureau  | 8                 |                    |                     | 0.35                 |    | 8  |    |
| Falk, K. G.        |            |               |                  | Columbia; MIT; Roosevelt Hospital                                      | 22                |                    |                     |                      | 13 |    | 9  |
| Foote, H. W.       | Yale       | 98            | X                | Yale   | 12                |                    |                     | 0.75                 | 11 | 1  |    |
| Frankfurter, G. B. | Berlin     | 93            | X                | Minnesota  | 19                |                    |                     | 0.90                 | 11 | 8  |    |
| Franklin, E. C.    | Hopkins    | 94            | X                | Kansas; Stanford   | 9                 |                    |                     | 0.45                 | 9  |    |    |
| Fraps, G. S.       | Hopkins    | 99            |                  | Texas College; Texas Experimental<br>Station                           | 11                |                    |                     | 0.73                 | 10 | 1  |    |
| Gill, A. H.        | Leipzig    | 90            | X                | MIT  | 17                |                    |                     | 0.74                 | 1  | 16 |    |
| Gladding, T. S.    | No         |               |                  | New York Produce Exchange  | 13                |                    |                     | 0.56                 | 2  | 11 |    |
| Gomberg, M.        | Michigan   | 94            | X                | Michigan   | 20                |                    |                     | 1.00                 | 18 | 2  |    |
| Gordin, H. M.      | Berne      | 97            | X                | Northwestern   | 9                 |                    |                     | 0.53                 | 1  | 3  | 5  |
| Handy, J. O.       | No         |               |                  | Pittsburgh Testing Laboratory  | 8                 |                    |                     | 0.47                 |    | 8  |    |
| Harding, E. P.     | Heidelberg | 00            | X                | Minnesota  | 13                |                    |                     | 0.93                 | 5  | 8  |    |
| Hart, E. B.        | No         |               | X                | New York Agricultural Experimental<br>Station; University of Wisconsin | 8                 |                    |                     | 0.67                 |    | 8  |    |
| Hawk, P. B.        | Columbia   | 03            |                  | Pennsylvania; Illinois; Jefferson<br>Medical College                   | 16                |                    |                     | 1.45                 |    |    | 16 |
| Haywood, J. K.     |            |               |                  | USDA   | 9                 |                    |                     |                      | 1  | 6  | 2  |
| Heath, G. L.       | No         |               |                  | Industry   | 9                 |                    |                     | 0.45                 |    | 9  |    |
| Herty, A. H.       | Hopkins    | 90            |                  | Georgia; North Carolina  | 11                |                    |                     | 0.58                 | 6  | 5  |    |
|                    | Berlin     | 99            | X                |  |                   |                    |                     |                      |    |    |    |
|                    | Zurich     | 00            | X                |  |                   |                    |                     |                      |    |    |    |

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| Name              | Place                     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                           | Total<br>Articles | Principal<br>Field | Listed<br>1879-1891 | Productivity<br>Rate | P  | A  | M  |
|-------------------|---------------------------|---------------|------------------|---|-------------------|--------------------|---------------------|----------------------|----|----|----|
| Hildebrand, J. H. | Penn                      | 06            | X                | Penn; Berkeley                                    | 10                |                    |                     | 0.71                 | 9  | 1  |    |
| Hillebrand, W. F. | Heidelberg                | 75            | X                | USGS; Bureau of Standards                         | 13                |                    |                     | 0.57                 | 5  | 8  |    |
| Howe, J. L.       | Berlin                    | 82            | X                | Washington & Lee                                  | 11                |                    |                     | 0.48                 | 10 | 1  |    |
|                   | Goettinger                | 82            | X                |   |                   |                    |                     |                      |    |    |    |
| Hudson, C. S.     | Princeton                 | 07            |                  | USDA  | 22                |                    |                     | 3.14                 | 13 | 9  |    |
| James, C.         | No                        |               | X                | New Hampshire College                             | 31                |                    |                     | 5.17                 | 31 |    |    |
| Jamieson, G. S.   | Yale                      | 04            |                  | Yale  | 10                |                    |                     | 1.00                 | 6  | 4  |    |
| Johnson, T. B.    | Yale                      | 01            |                  | Yale  | 42                |                    |                     | 3.23                 | 42 |    |    |
| Johnston, John    | St. Andrews<br>(Scotland) | 08            | X                | Carnegie Institute                                | 10                |                    |                     | 1.67                 | 9  | 1  |    |
| Kelley, W. P.     | Berkeley                  | 12            |                  | Berkeley; Hawaii Experimental Station             | 9                 |                    |                     | 4.50                 | 1  | 8  |    |
| Kober, P. A.      | No                        |               |                  | Rockefeller Institute; Roosevelt<br>Hospital      | 12                |                    |                     | 6.00                 | 5  | 7  |    |
| Kraus, C. A.      | MIT                       | 08            |                  | MIT   | 10                |                    |                     | 1.67                 | 10 |    |    |
| Langmuir, I.      | Goettingen                | 06            | X                | Stevens Institute; GE Company                     | 9                 |                    |                     | 1.13                 | 9  |    |    |
| Leach, A. E.      |                           |               |                  | Massachusetts State Board of Health               | 8                 |                    |                     |                      |    | 8  |    |
| Lenher, V.        | Penn                      | 98            |                  | Wisconsin   | 35                |                    |                     | 2.19                 | 29 | 6  |    |
| Lewis, C. N.      | Harvard                   | 99            | X                | MIT; Berkeley                                     | 28                |                    |                     | 1.87                 | 28 |    |    |
| Linebarger, C. E. | No                        |               | X                | Lake View High School (Chicago)                   | 12                |                    |                     | 0.63                 | 12 |    |    |
| Long, J. H.       | Tubingen                  | 79            | X                | Northwestern                                      | 30                |                    |                     | 1.30                 | 7  | 3  | 20 |
| Lythgoe, H. C.    | No                        |               |                  | Massachusetts State Board of Health               | 12                |                    |                     | 1.50                 |    | 12 |    |
| McCoy, H.         | Chicago                   | 98            |                  | Chicago   | 10                |                    |                     | 0.63                 | 10 |    |    |
| McDhiney, P. C.   | Columbia                  | 94            |                  | Columbia Department of Metallurgy;<br>Independent | 12                |                    |                     | 0.60                 |    | 12 |    |
| Mabery, C. F.     | Harvard                   | 81            |                  | Case  | 14                |                    |                     | 0.61                 |    | 11 | 3  |
| Meade, R. K.      | No                        |               |                  | Industry  | 8                 |                    |                     | 1.00                 |    | 8  |    |

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## APPENDIX XI

(Continued)

| Name              | Place           | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                                     | Total<br>Articles | Principal<br>Field | Listed<br>1879-1891 | Productivity<br>Rate | P  | A  | M |
|-------------------|-----------------|---------------|------------------|---|-------------------|--------------------|---------------------|----------------------|----|----|---|
| Menzies, A. W. C. | Chicago         | 10            |                  | Chicago   | 13                |                    |                     | 1.44                 | 13 |    |   |
| Metzger, F. J.    | Columbia        | 02            |                  | Columbia  | 11                |                    |                     | 0.92                 | 5  | 6  |   |
| Morgan, J. L. R.  | Leipzig         | 95            | X                | Columbia  | 29                |                    |                     | 1.53                 | 27 | 2  |   |
| Norton, T. H.     | Heidelberg      | 75            | X                | Cincinnati; U.S. Consul                                     | 10                |                    |                     | 0.43                 | 6  | 4  |   |
| Noyes, A. A.      | Leipzig         | 90            | X                | MIT   | 31                |                    |                     | 1.35                 | 31 |    |   |
| Noyes, W. A.      | Hopkins         | 82            |                  | Terre Haute   | 26                |                    |                     | 1.13                 | 19 | 7  |   |
| Osborne, T. B.    | Munich          | 89            | X                |   |                   |                    |                     |                      |    |    |   |
|                   | Yale            | 85            |                  | Connecticut Agricultural Experimental<br>Station            | 28                |                    |                     | 1.22                 | 9  | 14 | 5 |
| Parr, S. W.       | No              |               | X                | Illinois  | 18                |                    |                     | 0.78                 | 3  | 15 |   |
| Parsons, C. L.    | No              |               |                  | New Hampshire College; U.S. Bureau<br>of Mines              | 16                |                    |                     | 0.84                 | 9  | 7  |   |
| Prescott, A. B.   | M.D.            |               |                  | Michigan  | 15                |                    |                     | 1.07                 | 11 | 4  |   |
| Richards, T. W.   | Harvard         | 88            | X                | Harvard   | 33                |                    |                     | 1.43                 | 33 |    |   |
| Richardson, W. D. | No              |               |                  | Swift and Co.   | 9                 |                    |                     | 0.90                 |    | 9  |   |
| Rosanoff, M. A.   | No              |               | X                | NYU; Clark  | 17                |                    |                     | 1.42                 | 17 |    |   |
| Schreiner, O.     | Wisconsin       | 02            | X                | Bureau of Soils; USDA                                       | 13                |                    |                     | 1.08                 |    | 13 |   |
| Seidell, A.       | Hopkins         | 03            |                  | USDA; USPH  | 8                 |                    |                     | 0.73                 | 8  |    |   |
| Sherman, H. C.    | Columbia        | 97            |                  | Columbia  | 33                |                    |                     | 1.94                 |    | 26 | 7 |
| Shorey, E. C.     | Queens (Canada) | 94            | X                | Hawaii Sugar Company; USDA                                  | 15                |                    |                     | 0.83                 |    | 15 |   |
| Smith, A.         | Munich          | 89            | X                | University of Chicago; Columbia                             | 8                 |                    |                     | 0.35                 | 8  |    |   |
| Smith, E. F.      | Goettingen      | 76            | X                | Penn  | 59                |                    |                     | 2.57                 | 59 |    |   |
| Smith, G. McP.    | Freiburg        | 03            | X                | Illinois  | 10                |                    |                     | 0.91                 | 10 |    |   |
| Stieglitz, J.     | Berlin          | 89            | X                | Chicago   | 8                 |                    |                     | 0.35                 | 8  |    |   |
| Tartar, H. V.     | Michigan        | 14            |                  | Oregon Agricultural Experimental<br>Station; Oregon College | 12                |                    |                     | 3.00                 |    | 12 |   |
|                   | Chicago         | 20            |                  |   |                   |                    |                     |                      |    |    |   |

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(Continued)

| <u>Name</u>        | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|--------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|----------------------------------|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| Carhart, H. S.     | No           |                             | X                              | Michigan                              | 6                                |                                  | 0.29                               |                                 | X                                 |
| Carman, A. P.      | Princeton    | 86                          | X                              | Purdue; Stanford; Illinois            | 4                                |                                  | 0.19                               |                                 |                                   |
| Carmichael, R. D.  | Princeton    | 11                          |                                | Indiana                               | 3                                | M                                | 0.75                               | X                               |                                   |
| Carpenter, H. V.   | No           |                             |                                | Washington State                      | 2                                |                                  | 0.16                               |                                 |                                   |
| * Carter, E.       | Wverzburg    | 06                          | X                              | Vassar                                | 14                               |                                  | 0.12                               |                                 |                                   |
| Cartmel, W. B.     | No           |                             |                                | Cincinnati; New Brunswick             | 1                                |                                  | 0.06                               |                                 |                                   |
| Caswell, A. E.     | Stanford     | 11                          |                                | Purdue; Oregon                        | 11                               |                                  | 0.25                               |                                 |                                   |
| Chamberlain, C. W. | Columbia     | 10                          |                                | Vassar                                | 1                                |                                  | 0.20                               |                                 |                                   |
| Chapman, A. K.     | Princeton    | 14                          |                                |                                       | 14                               |                                  | 1.00                               |                                 |                                   |
| Chapman, E. K.     |              |                             |                                |                                       | 1                                |                                  |                                    |                                 |                                   |
| Chrisler, V. L.    |              |                             |                                |                                       | 2                                |                                  |                                    |                                 |                                   |
| Clark, A. L.       | Clark        | 04                          |                                | Bates; Kingston School of Mining      | 13, 15                           |                                  | 0.18                               |                                 |                                   |
| Clark, H.          | Harvard      | 14                          | X                              | Harvard                               | 15                               |                                  | 1.00                               |                                 |                                   |
| Clark, H. A.       | Columbia     | 13                          |                                | Syracuse                              | 1                                |                                  | 0.50                               |                                 |                                   |
| Clifford, O. C.    | Chicago      | 07                          |                                | Armour                                | 1                                |                                  | 0.12                               |                                 |                                   |
| Cline, G. A.       |              |                             |                                |                                       | 1                                |                                  |                                    |                                 |                                   |
| Clinksales, G. B.  |              |                             |                                |                                       | 1                                |                                  |                                    |                                 |                                   |
| Coffin, J. G.      | Clark        | 03                          |                                | Clark; CCNY                           | 13,                              |                                  | 0.16                               |                                 |                                   |
| Coker, E. G.       |              |                             |                                |                                       | 2                                |                                  |                                    |                                 |                                   |
| Colby, W. F.       | Michigan     | 09                          | X                              | Michigan                              | 13,                              |                                  | 0.33                               |                                 |                                   |
| Cole, A. D.        | No           |                             | X                              | OSU                                   | 4                                |                                  | 0.19                               |                                 |                                   |
| Compton, A. H.     | Princeton    | 16                          |                                | Princeton                             | 2                                |                                  | 2.00                               |                                 |                                   |
| Compton, K. T.     | Princeton    | 12                          |                                | Reed; Princeton                       | 5                                |                                  | 1.66                               | X                               |                                   |
| Cook, S. R.        | Cornell      | 05                          | X                              | Pacific College                       | 2                                |                                  | 0.20                               |                                 |                                   |
| Coolidge, W. D.    | Leipzig      | 99                          | X                              | General Electric                      | 13                               | C                                | 0.06                               |                                 |                                   |
| Cornelius, D. W.   | Illinois     | 12                          |                                | Ottawa; Kansas; Missouri              | 13                               |                                  | 0.33                               |                                 |                                   |

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(Continued)

| <u>Name</u>       | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>      | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|-------------------|--------------|-----------------------------|--------------------------------|--|----------------------------------|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| Coulson, J.       |              |                             |                                |  | 14                               |                                  |                                    |                                 |                                   |
| Crandall, I. B.   | Princeton    | 16                          |                                | Western Electric                           | 13                               |                                  | 1.00                               |                                 |                                   |
| Crantham, G. E.   |              |                             |                                |  | 14                               |                                  |                                    |                                 |                                   |
| Crehore, A. C.    | Cornell      | 93                          |                                | NELA                                       | 4                                | EN                               | 0.22                               |                                 |                                   |
| * Crum, L. B.     |              |                             |                                |  | 11                               |                                  |                                    |                                 |                                   |
| Culver, C. A.     |              |                             |                                |  | 14,                              |                                  |                                    |                                 |                                   |
| Daniel, J.        | No           |                             | X                              | Vanderbilt                                 | 1                                |                                  | 0.05                               |                                 |                                   |
| Davidson, J. G.   | Berkéley     | 07                          |                                | McGill                                     | 1                                |                                  | 0.12                               |                                 |                                   |
| Davis, B.         | Columbia     | 01                          | X                              | Columbia                                   | 6                                |                                  | 0.42                               | X                               |                                   |
| Davis, H. N.      | Harvard      | 06                          |                                | Harvard                                    | 1                                | EN                               | 0.11                               |                                 |                                   |
| Day, A. L.        | Yale         | 94                          | X                              | USGS; Carnegie Institution                 | 1                                | G                                | 0.05                               |                                 |                                   |
| Day, W. S.        | Hopkins      | 97                          |                                | Columbia                                   | 1                                |                                  | 0.05                               |                                 |                                   |
| Dean, G. R.       | No           |                             |                                | Missouri School of Mines                   | 1                                | M                                | 0.05                               |                                 |                                   |
| Dellinger, J. H.  | Princeton    | 13                          |                                | Bureau of Standards                        | 1                                |                                  | 0.50                               |                                 |                                   |
| DeLury, R. E.     | Toronto      | 07                          |                                | Dominion Observatory                       | 2                                | A                                | 0.25                               |                                 |                                   |
| Dempster, A. J.   | Chicago      | 16                          |                                | Chicago                                    | 12                               |                                  | 1.00                               |                                 |                                   |
| Dennis, L. F.     |              |                             |                                |  | 1                                |                                  |                                    |                                 |                                   |
| Dietrich, E. O.   |              |                             |                                |  | 14                               |                                  |                                    |                                 |                                   |
| Dike, P. H.       | Wisconsin    | 11                          |                                |  |                                  |                                  |                                    |                                 |                                   |
| Dinwiddie, W. W.  | No           |                             |                                | U.S. Naval Observatory; Alvan Clark & Sons | 1                                | A                                | 0.09                               |                                 |                                   |
| Dodge, H. L.      | Iowa         | 14                          |                                | Iowa                                       | 3                                |                                  | 3.00                               | X                               |                                   |
| Dorsey, H. G.     | Cornell      | 08                          |                                | Western Electric; National Cash Register   | 3                                |                                  | 0.43                               | X                               |                                   |
| Dorsey, N. E.     | Hopkins      | 97                          |                                | USDA; Bureau of Standards                  | 2                                |                                  | 0.11                               |                                 |                                   |
| Doubt, T. E.      | Chicago      | 04                          |                                | Armour                                     | 1                                |                                  | 0.09                               |                                 |                                   |
| Douglas, J. F. H. | Cornell      | 14                          |                                | Iowa State                                 | 11, 14                           |                                  | 2.00                               |                                 |                                   |

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| Name             | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment             | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|------------------|------------|---------------|------------------|-------------------------------------|--------------------|--------------------|----------------------|-------------------|---------------------|
| Drew, E. R.      | Berlin     | 97            | X                | Colorado; Curie Laboratory; Harvard | 4                  |                    |                      |                   |                     |
| Duane, W.        | No         |               |                  | Philadelphia Observatory            | 5                  |                    | 0.28                 |                   |                     |
| DuBois, H. W.    | Brown      | 05            |                  | Case; Western Reserve               | 1                  | A                  | 0.05                 |                   |                     |
| Duff, A. W.      | Edinburgh  | 01            | X                | Worcester                           | 3                  |                    | 0.10                 |                   |                     |
| Duncan, R. W.    | Penn       | 12            |                  | Penn                                | 13                 |                    | 0.21                 |                   |                     |
| Dushman, S.      | Toronto    | 12            | X                | General Electric                    | 14, 15             | C                  | 0.33                 |                   |                     |
| Eddy, H. T.      | Yale       | 72            | X                | Minnesota                           | 2                  |                    | 0.66                 |                   |                     |
| Edmondson, T. W. | Clark      | 96            |                  | NYU                                 | 1                  | M                  | 0.10                 |                   |                     |
| Edmunds, C. K.   | Hopkins    | 03            |                  | Canton Christian College, China     | 1                  |                    | 0.05                 |                   |                     |
| Edwards, P. H.   |            |               |                  |                                     | 1                  |                    | 0.08                 |                   |                     |
| Elliott, D. S.   | Hopkins    | 14            |                  | Georgia Tech                        | 1                  |                    | 1.00                 |                   |                     |
| Elmen, G. W.     |            |               |                  |                                     | 1                  |                    |                      |                   |                     |
| Erikson, H. A.   | Minnesota  | 07            |                  | Minnesota                           | 1                  |                    | 0.13                 |                   |                     |
| Ewell, A. W.     | Yale       | 99            | X                | Worcester                           | 4                  |                    | 0.25                 |                   |                     |
| Eyring, C. F.    |            |               |                  |                                     | 15                 |                    |                      |                   |                     |
| Farnau, E. F.    | Cincinnati | 12            |                  | NYU                                 | 12                 | C                  | 0.33                 |                   |                     |
| Farwell, H. W.   | No         |               |                  | Columbia                            | 15                 |                    | 0.13                 |                   |                     |
| Farwell, S. P.   | Illinois   | 14            |                  | Public Utilities Commission         | 14                 | EN                 | 1.00                 |                   |                     |
| Fenner, R. C.    | No         |               |                  | Cutler-Hammer Company               | 1                  | EN                 | 0.14                 |                   |                     |
| Ferguson, O. J.  | No         |               |                  | Union; Nebraska                     | 1                  | EN                 | 0.08                 |                   |                     |
| Ferry, E. S.     | No         |               |                  | Purdue                              | 3                  |                    | 0.16                 |                   | X                   |
| Fessenden, R. A. | No         |               |                  | Various Companies                   | 2                  | EN                 | 0.09                 |                   |                     |
| Field, P.        | Cornell    | 02            |                  | Michigan                            | 1                  | M                  | 0.08                 |                   |                     |
| * Finney, F. K.  |            |               |                  |                                     | 15                 |                    |                      |                   |                     |
| Fislier, W. J.   | Cornell    | 08            | X                | Cornell; New Hampshire College      | 6                  |                    | 0.86                 | X                 |                     |

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| Name                 | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                   | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|----------------------|------------|---------------|------------------|---|--------------------|--------------------|----------------------|-------------------|---------------------|
| Fletcher, H.         | Chicago    | 11            |                  | Brigham Young                             | 2                  |                    | 0.50                 |                   |                     |
| Flowers, A. E.       | Cornell    | 15            |                  | Missouri; OSU                             | 2                  | EN                 | 2.00                 |                   |                     |
| Foley, A. L.         | Cornell    | 99            | X                | Indiana                                   | 3                  |                    | 0.17                 |                   |                     |
| Foot, P. D.          | Minnesota  | 17            |                  | Bureau of Standards                       | 12                 |                    | 1.00                 |                   |                     |
| Forman, A. H.        | Cornell    | 11            |                  | West Virginia                             | 14                 | EN                 | 0.25                 |                   |                     |
| Forsythe, W. E.      | Wisconsin  | 11            |                  | Wisconsin; NELA                           | 12, 13             |                    | 0.50                 |                   |                     |
| Foster, W. F., Jr.   |            |               |                  |   | 2                  |                    |                      |                   |                     |
| Fountain, C. R.      | Columbia   | 08            |                  | Idaho; Williams; Kenyon; Georgia          | 1                  |                    | 0.14                 |                   |                     |
| Freudenberger, L. A. |            |               |                  |   | 1                  |                    |                      |                   |                     |
| * Frisbie, F.        |            |               |                  |   | 1                  |                    |                      |                   |                     |
| Gaehr, P. R.         | Cornell    | 09            |                  | Wells                                     | 1                  |                    | 0.16                 |                   |                     |
| Gage, H. P.          | Cornell    | 11            |                  | Corning Glass                             | 11                 |                    | 0.25                 |                   |                     |
| Gage, O. A.          | Cornell    | 10            |                  | Wisconsin                                 | 2                  |                    | 0.40                 |                   |                     |
| Gale, H. G.          | Chicago    | 99            |                  | Chicago                                   | 1                  |                    | 0.06                 |                   |                     |
| * Gates, F. C.       | Penn       | 09            | X                | Goucher; Grinnell                         | 2                  |                    | 0.33                 |                   |                     |
| Geer, W. C.          | Cornell    | 05            |                  | B. F. Goodrich                            | 1                  | C                  | 0.10                 |                   |                     |
| Gibbs, R. C.         | Cornell    | 10            |                  | Cornell                                   | 3                  |                    | 0.60                 | X                 |                     |
| Gilchrist, L.        |            |               |                  |   | 13                 |                    |                      |                   |                     |
| Gish, O. H.          |            |               |                  |   | 14                 |                    |                      |                   |                     |
| Goddard, R. H.       | Clark      | 11            |                  | Worcester; Princeton; Clark               | 3                  |                    | 0.75                 | X                 |                     |
| Goldsmith, A. N.     | Columbia   | 11            |                  | CCNY                                      | 1                  | EN                 | 0.25                 |                   |                     |
| Goodman, H. M.       |            |               | X                |   | 1                  |                    |                      |                   |                     |
| Gordon, C. McC.      | Goettingen | 97            | X                | Central University of Kentucky; Lafayette | 1                  |                    | 0.08                 |                   |                     |
| Gowdy, R. C.         | Cincinnati | 09            | X                | Lehigh; Cincinnati                        | 14                 |                    | 0.33                 |                   |                     |
| Gray, A. W.          | Berlin     | 04            | X                | Berkeley; Bureau of Standards             | 4                  |                    | 0.37                 | X                 |                     |
| Gray, T.             |            |               |                  |   | 1                  |                    |                      |                   |                     |

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| <u>Name</u>       | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>                     | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|-------------------|--------------|-----------------------------|--------------------------------|---|----------------------------------|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| Greene, C. W.     | Michigan     | 12                          |                                | Albion  | 14 1                             | EN                               | 0.33                               |                                 |                                   |
| Gressman, G. W.   |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Grondahl, L. O.   | Hopkins      | 08                          |                                | Washington (Seattle); Carnegie<br>Institute of Technology | 14, 11 2                         |                                  | 0.28                               |                                 |                                   |
| Gumaer, P. W.     |              |                             |                                |   | 12 1                             |                                  |                                    |                                 |                                   |
| Gurney, L. E.     | Chicago      | 06                          |                                | Idaho   | 3                                |                                  | 0.33                               | X                               |                                   |
| Hagenow, C. F.    | Chicago      | 19                          |                                | Armour  | 1                                |                                  | 1.00                               |                                 |                                   |
| Ham, W. R.        |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Harris, J. E.     | Michigan     | 11                          |                                | Michigan  | 12 1                             | C                                | 0.25                               |                                 |                                   |
| Harris, R. A.     | Cornell      | 88                          |                                | USCGS   | 1                                |                                  | 0.05                               |                                 |                                   |
| Harris, W. D.     | No           |                             |                                | Syracuse  | 1                                |                                  | 0.13                               |                                 |                                   |
| Hart, J. H.       |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Hartman, L. W.    | Penn         | 03                          | X                              | Utah; Nevada  | 5                                |                                  | 0.42                               | X                               |                                   |
| Hartsbough, R. L. |              |                             |                                |   | 14 1                             |                                  | 1.00                               |                                 |                                   |
| Harvey, F. A.     | Berkeley     | 09                          |                                | Syracuse; Solvay Company                                  | 12, 2                            |                                  | 0.33                               |                                 |                                   |
| Haskell, R.       |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Haskins, C. N.    | Harvard      | 01                          | X                              | Cornell; Illinois; Dartmouth                              | 14 1                             | M                                | 0.07                               |                                 |                                   |
| Havelock, T. H.   |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Hayes, H. C.      | Harvard      | 11                          |                                | Harvard; Swarthmore                                       | 14 1                             |                                  | 0.25                               |                                 |                                   |
| Heald, W. H.      |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Heaps, C. W.      | Princeton    | 12                          |                                | Missouri; Rice  | 1                                |                                  | 0.33                               |                                 |                                   |
| Hebb, T. C.       | Chicago      | 04                          |                                | North State Normal School                                 | 1                                |                                  | 0.09                               |                                 |                                   |
| Heising, R. A.    | No           |                             |                                | Western Electric  | 14 1                             |                                  | 1.00                               |                                 |                                   |
| Henderson, W. D.  | Michigan     | 06                          |                                | Michigan  | 3                                |                                  | 0.33                               | X                               |                                   |
| Hendren, L. L.    | Columbia     | 05                          |                                | Trinity (Duke); Georgia                                   | 1                                |                                  | 0.10                               |                                 |                                   |
| Hennings, A. E.   | Chicago      | 14                          |                                | University High School, Chicago                           | 3                                |                                  | 3.00                               | X                               |                                   |

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## APPENDIX IV

(Continued)

| <u>Name</u>        | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>                       | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|--------------------|--------------|-----------------------------|--------------------------------|---|----------------------------------|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| Hewlett, C. W.     | Hopkins      | 12                          |                                | Hopkins   | 12 1                             |                                  | 0.33                               |                                 |                                   |
| Heyl, P. R.        | Penn         | 99                          |                                | Central High (Philadelphia);<br>Commercial Research Company | 6                                |                                  | 0.38                               |                                 |                                   |
| Hiatt, C. E.       |              |                             |                                |   | 2                                |                                  |                                    |                                 |                                   |
| Hill, B. V.        | Berlin       | 02                          | X                              | Chicago Telephone   | 3                                |                                  | 0.23                               |                                 |                                   |
| Ho, H.             |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Hodge, P.          |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Holborn, L.        |              |                             |                                |   | 1                                |                                  |                                    |                                 |                                   |
| Holman, W. F.      | Goettingen   | 08                          | X                              | Minnesota   | 1                                |                                  | 0.14                               |                                 |                                   |
| Monda, K.          |              |                             |                                |   | 2                                |                                  |                                    |                                 |                                   |
| Hornbeck, J. W.    | Illinois     | 13                          |                                | Illinois; Cornell   | 13 1                             |                                  | 0.50                               |                                 |                                   |
| Hotchkiss, H. J.   | No           |                             |                                | Drexel  | 2                                |                                  | 0.10                               |                                 |                                   |
| Householder, F. F. |              |                             |                                |   | 14 1                             |                                  |                                    |                                 |                                   |
| Hovda, O.          |              |                             |                                |   | 12 1                             |                                  |                                    |                                 |                                   |
| Howe, H. E.        | Cornell      | 16                          |                                | Randolph-Macon  | 1                                |                                  | 1.00                               |                                 |                                   |
| * Howell, J. T.    |              |                             |                                |   | 15 1                             |                                  |                                    |                                 |                                   |
| Howes, H. L.       | Cornell      | 15                          |                                | Carnegie Institution  | 15 1                             |                                  | 1.00                               |                                 |                                   |
| Hoyt, J. E.        |              |                             |                                |   | 12 1                             |                                  |                                    |                                 |                                   |
| Hubbard, J. C.     | Clark        | 04                          |                                | Clark   | 3                                |                                  | 0.27                               |                                 |                                   |
| Hudson, C. S.      | Princeton    | 07                          |                                | USDA  | 3                                | C                                | 0.43                               | X                               |                                   |
| Huff, W. B.        | Hopkins      | 00                          | X                              | Bryn Mawr   | 12, 2                            |                                  | 0.13                               |                                 |                                   |
| Hufford, M. E.     | Indiana      | 16                          |                                | Indiana   | 14 1                             |                                  | 1.00                               |                                 |                                   |
| Hull, G. F.        | Chicago      | 97                          | X                              | Dartmouth   | 2                                |                                  | 0.11                               |                                 |                                   |
| Humphreys, W. J.   | Hopkins      | 97                          |                                | U.S. Weather Bureau   | 6                                |                                  | 0.33                               | X                               |                                   |
| Hutchins, C. C.    | No           |                             | X                              | Bowdoin   | 1                                |                                  | 0.55                               |                                 | X                                 |
| * Hyatt, S.        |              |                             |                                |   | 12 1                             |                                  |                                    |                                 |                                   |
| Ingersoll, L. R.   | Wisconsin    | 05                          |                                | Wisconsin   | 5                                |                                  | 0.50                               | X                               |                                   |

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| <u>Name</u>      | <u>Place</u>        | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|------------------|---------------------|-----------------------------|--------------------------------|---------------------------------------|---|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| Irving, T. P.    | Catholic University | 09                          |                                | Notre Dame; Holy Cross                | 1                                       |                                  | 0.16                               |                                 |                                   |
| Ives, J. E.      | Clark               | 01                          |                                | Cincinnati; Clark                     | 6                                       |                                  | 0.43                               | X                               |                                   |
| Jewett, F. B.    | Chicago             | 02                          |                                | AT&T                                  | 1                                       |                                  | 0.08                               |                                 |                                   |
| Johannott, E. S. | Chicago             | 98                          |                                | Rose                                  | 1                                       |                                  | 0.06                               |                                 |                                   |
| Johnson, A. R.   | Wisconsin           | 11                          |                                | Industrial Laboratories               | 11                                      | C                                | 0.25                               |                                 |                                   |
| Johnson, J. B.   | Yale                | 17                          |                                | Yale                                  | 15                                      | 1                                | 1.00                               |                                 |                                   |
| Jones, H. C.     | Hopkins             | 92                          | X                              | Hopkins                               | 2                                       | C                                | 0.10                               |                                 |                                   |
| Jones, L. A.     | No                  |                             |                                | Bureau of Standards                   | 14,                                     | 2                                | 0.66                               |                                 |                                   |
| Jones, L. T.     | Illinois            | 15                          |                                | Berkeley                              | 14                                      | 1                                | 1.00                               |                                 |                                   |
| * Joslin, L. B.  | No                  |                             |                                | Goucher                               | 1                                       |                                  | 0.25                               |                                 |                                   |
| Kabakjian, D. H. | Penn                | 10                          |                                | Penn                                  | 2                                       |                                  | 0.40                               |                                 |                                   |
| Kadsch, W. H.    | Chicago             | 15                          |                                | Annapolis                             | 14                                      | 1                                | 1.00                               |                                 |                                   |
| Kann, L.         |                     |                             |                                |                                       | 1                                       |                                  |                                    |                                 |                                   |
| Karrer, E.       | Hopkins             | 14                          |                                | U.S. Gas Improvement Company          | 15                                      | 1                                | 1.00                               |                                 |                                   |
| Kemp, J. G.      | Illinois            | 12                          |                                | Arkansas; Baker                       | 13                                      | 1                                | 0.33                               |                                 |                                   |
| Kennard, E. H.   | Cornell             | 13                          |                                | Cornell; Minnesota                    | 13, 14                                  | 2                                | 2.00                               |                                 |                                   |
| Kennelly, A. E.  | No                  |                             | X                              | Harvard                               | 1                                       |                                  | 0.05                               |                                 | X                                 |
| Kester, F. E.    | Cornell             | 05                          | X                              | OSU; Kansas                           | 2                                       |                                  | 0.20                               |                                 |                                   |
| Kinura, S.       |                     |                             |                                |                                       | 12                                      | 1                                |                                    |                                 |                                   |
| King, R. W.      | Cornell             | 15                          |                                | Cornell                               | 15                                      | 1                                | 1.00                               |                                 |                                   |
| Kinsley, C.      | No                  |                             | X                              | Chicago                               | 2                                       |                                  | 0.12                               |                                 |                                   |
| Klopsteg, P. E.  | Minnesota           | 16                          |                                | Minnesota                             | 13, 14                                  | 2                                | 2.00                               |                                 |                                   |
| Knowlton, A. A.  | Chicago             | 10                          |                                | Armour; Utah                          | 1                                       |                                  | 0.20                               |                                 |                                   |
| Knudsen, M.      |                     |                             |                                |                                       | 1                                       |                                  |                                    |                                 |                                   |
| Kovarik, A. F.   | Minnesota           | 09                          | X                              | Minnesota                             | 3                                       |                                  | 0.50                               | X                               |                                   |

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(Continued)

| <u>Name</u>           | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|-----------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|---|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| Kraus, C. A.          | MIT          | 08                          |                                | MIT                                   | 2                                       | C                                | 0.28                               |                                 |                                   |
| * Laird, E. R.        | Bryn Mawr    | 01                          | X                              | Mt. Holyoke                           | 3                                       |                                  | 0.21                               |                                 |                                   |
| * Langford, G.        | No           |                             |                                | Wellesley; Barnard                    | 11                                      | 1                                | 0.06                               |                                 |                                   |
| Langmuir, I.          | Goettingen   | 06                          | X                              | General Electric                      | 5                                       | C                                | 0.56                               | X                               |                                   |
| Langsdorf, A. S.      | No           |                             |                                | Washington (St. Louis)                | 1                                       | EN                               | 0.10                               |                                 |                                   |
| Lassalle, L. J.       | Chicago      | 17                          |                                | Penn State                            | 15                                      | 1                                | 1.00                               |                                 |                                   |
| Laub, Y.              |              |                             |                                |                                       | 12                                      | 1                                |                                    |                                 |                                   |
| Le Conte, J. N.       | No           |                             |                                | Berkeley                              | 1                                       | EN                               | 0.60                               |                                 | X                                 |
| Lee, J. Y.            |              |                             |                                |                                       | 14                                      | 1                                |                                    |                                 |                                   |
| Lewis, E. P.          | Hopkins      | 95                          | X                              | Berkeley                              | 1                                       |                                  | 0.05                               |                                 |                                   |
| Lewis, G. N.          | Harvard      | 99                          | X                              | MIT; Berkeley                         | 3                                       |                                  | 0.19                               |                                 |                                   |
| Liebknecht, O.        |              |                             |                                |                                       | 1                                       |                                  |                                    |                                 |                                   |
| Lilienfeld, J. E.     |              |                             |                                |                                       | 14                                      | 2                                |                                    |                                 |                                   |
| Liebowitz, B.         | Columbia     | 15                          |                                | Independent                           | 15                                      | 1                                | 1.00                               |                                 |                                   |
| Lindsay, G. A.        | Michigan     | 13                          |                                | Michigan                              | 14                                      | 1                                | 0.08                               |                                 |                                   |
| Linebarger, C. E.     | No           |                             | X                              | Lake View High                        |   | C                                |                                    |                                 |                                   |
| Littleton, J. T., Jr. | Wisconsin    | 11                          |                                | Michigan; Corning Glass               | 11, 12                                  | 2                                | 0.50                               |                                 |                                   |
| Longden, A. C.        | Columbia     | 00                          |                                | Knox                                  | 4                                       |                                  | 0.27                               |                                 |                                   |
| Loomis, E. H.         | Strasburg    | 93                          | X                              | Princeton                             | 5                                       |                                  | 0.23                               |                                 |                                   |
| Luckiesch, M.         | No           |                             |                                | NELA                                  | 14                                      | 1                                | 0.25                               |                                 |                                   |
| Lunn, A. C.           | Chicago      | 04                          |                                | Chicago                               | 12                                      | 1                                | 0.09                               |                                 |                                   |
| Lyman, T.             | Harvard      | 00                          |                                | Harvard                               | 2                                       |                                  | 0.13                               |                                 |                                   |
| Lynde, C. J.          | Chicago      | 05                          |                                | Macdonald                             | 1                                       |                                  | 0.10                               |                                 |                                   |
| Lyon, E. R.           |              |                             |                                |                                       | 14                                      | 1                                |                                    |                                 |                                   |
| McClellan, W.         | Penn         | 00                          |                                | Penn                                  | 1                                       |                                  | 0.06                               |                                 |                                   |
| McComb, H. E.         |              |                             |                                |                                       | 15,                                     | 2                                |                                    |                                 |                                   |

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(Continued)

| Name            | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment        | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|-----------------|------------|---------------|------------------|--------------------------------|--------------------|--------------------|----------------------|-------------------|---------------------|
| Bancroft, W. D. | Leipzig    | 92            | X                | Cornell                        | 5                  |                    | 0.22                 |                   |                     |
| Barker, H. C.   | Penn       | 07            |                  | Penn                           | 2                  |                    | 0.28                 |                   |                     |
| Barnes, H. T.   | McGill     | 00            |                  | McGill                         | 5                  |                    | 0.33                 | X                 |                     |
| Barnes, J.      | Hopkins    | 04            |                  | Bryn Mawr                      | 1                  |                    | 0.09                 |                   |                     |
| Batdorf, C. W.  |            |               |                  |                                | 12                 |                    |                      |                   |                     |
| Baver, L. A.    | Berlin     | 95            | X                | USCGS; Carnegie Institution    | 3                  |                    | 0.15                 |                   |                     |
| Baum, F. G.     | No         |               |                  | Stanford; Consulting Engineer  | 2                  | EN                 | 0.12                 |                   |                     |
| Bearce, H. W.   |            |               |                  |                                | 1                  |                    |                      |                   |                     |
| Beck, W. P.     |            |               |                  |                                | 1                  |                    |                      |                   |                     |
| Becknell, G. G. | Clark      | 11            |                  | Syracuse; Northwestern         | 1                  |                    | 0.25                 |                   |                     |
| Bedell, F.      | Cornell    | 92            |                  | Cornell                        | 6                  | EN                 | 0.23                 |                   |                     |
| Begeman, L.     | Chicago    | 10            |                  | Iowa State Teachers            | 1                  |                    | 0.20                 |                   |                     |
| Behnken, H. E.  |            |               |                  |                                | 1                  |                    |                      |                   |                     |
| Benedict, F. C. | Heidelberg | 95            | X                | Wesleyan; Carnegie Institution | 1                  | C                  | 0.05                 |                   |                     |
| Benton, J. R.   | Goettingen | 00            | X                | Florida                        | 6                  |                    | 0.40                 | X                 |                     |
| Bevier, Jr., L. |            |               |                  |                                | 6                  |                    |                      |                   |                     |
| Bidwell, C. C.  | Cornell    | 14            |                  | Cornell                        | 3                  |                    | 3.00                 | X                 |                     |
| Bishop, E. S.   | No         |               |                  | Nebraska; Mellon Institute     | 11                 | C                  | 1.00                 |                   |                     |
| Bishop, F. L.   | Chicago    | 05            |                  | Pittsburgh                     | 1                  |                    | 0.10                 |                   |                     |
| Bjerknes, V.    |            |               |                  |                                | 1                  |                    |                      |                   |                     |
| Blair, W. R.    | Chicago    | 04            |                  | Mount Weather Observatory      | 1                  | ME                 | 0.09                 |                   |                     |
| Blake, F. C.    | Columbia   | 05            | X                | OSU                            | 6                  |                    | 0.60                 | X                 |                     |
| Blaker, E.      | Cornell    | 01            |                  | Cornell                        | 1                  |                    | 0.05                 |                   |                     |
| Bliss, W. J. A. | Hopkins    | 94            |                  | Hopkins                        | 2                  |                    | 0.09                 |                   |                     |
| Boehm, W. M.    | Penn       | 10            |                  | Penn                           | 2                  |                    | 0.40                 |                   |                     |
| Book, W. I.     |            |               |                  |                                | 13                 |                    |                      |                   |                     |

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| Name             | Place           | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment             | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|------------------|-----------------|---------------|------------------|-------------------------------------|--------------------|--------------------|----------------------|-------------------|---------------------|
| Boyd, J. E.      | No              |               |                  | OSU                                 | 1                  |                    | 0.05                 |                   |                     |
| Boynton, W. P.   | Clark           | 97            |                  | Oregon                              | 6                  |                    | 0.23                 |                   |                     |
| Brace, D. B.     |                 |               |                  |                                     | 3                  |                    | 0.27                 |                   |                     |
| Brackett, B. B.  | Hopkins         | 97            |                  | Clarkson; South Dakota              | 1                  | EN                 | 0.04                 |                   |                     |
| Bradley, W. P.   | Goettingen      | 89            | X                | Wesleyan                            | 6                  | C                  | 0.23                 |                   |                     |
| Brakel, H. L.    |                 |               |                  |                                     | 12                 |                    |                      |                   |                     |
| * Brant, L. C.   | No              |               |                  | Smith; Barnard                      | 1                  |                    | 0.25                 |                   |                     |
| Bridgman, P. W.  | Harvard         | 08            |                  | Harvard                             | 6                  |                    | 0.86                 | X                 |                     |
| Briggs, L. J.    | Hopkins         | 01            |                  | USDA                                | 1                  |                    | 0.05                 |                   |                     |
| Brown, J. G.     |                 |               |                  |                                     | 11                 |                    |                      |                   |                     |
| Brown, N. H.     |                 |               |                  |                                     | 1                  |                    |                      |                   |                     |
| Brown, S. L.     |                 |               |                  |                                     | 5                  |                    |                      |                   |                     |
| Brush, C. F.     | Western Reserve | 80            |                  | Brush Electric                      | 1                  | EN                 | 0.03                 |                   |                     |
| Bingham, E. C.   | Hopkins         | 05            |                  | Richmond                            | 12, 13             |                    | 0.20                 |                   |                     |
| Buckingham, E.   | Leipzig         | 93            | X                | Bryn Mawr; Wisconsin; USDA;         | 5                  |                    | 0.19                 |                   |                     |
|                  |                 |               |                  | Bureau of Standards                 |                    |                    |                      |                   |                     |
| Buckley, O. E.   | Cornell         | 14            |                  | Cornell; Western Electric           | 14                 |                    | 1.00                 |                   |                     |
| Burbank, J. E.   | No              |               |                  | USCGS                               | 1                  |                    | 0.06                 |                   |                     |
| Burbridge, H. C. | Stanford        | 13            |                  | Stanford                            | 13                 |                    | 0.50                 |                   |                     |
| Burgess, G. K.   | Paris           | 01            | X                | Bureau of Standards                 | 2                  |                    | 0.28                 |                   |                     |
| Burnett, E. S.   | No              |               |                  | Wisconsin; Cornell                  | 1                  | EN                 | 0.14                 |                   |                     |
| Butman, C. A.    | No              |               |                  | Massachusetts Agricultural College; | 13                 |                    | 0.20                 |                   |                     |
|                  |                 |               |                  | Westinghouse                        |                    |                    |                      |                   |                     |
| Cady, W. C.      | Berlin          | 00            | X                | Wesleyan                            | 13                 |                    | 0.06                 |                   |                     |
| Callendar, H. L. |                 |               |                  |                                     | 1                  |                    |                      |                   |                     |
| Campbell, G. A.  | Harvard         | 01            | X                | AT&T                                | 15                 | EN                 | 0.05                 |                   |                     |

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| <u>Name</u>     | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|-----------------|--------------|-----------------------------|--------------------------------|---------------------------------------|----------------------------------|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| McCoy, H. N.    | Chicago      | 98                          |                                | Chicago                               | 3                                | C                                | 0.18                               |                                 |                                   |
| * McDowell, L.  | Cornell      | 09                          |                                | Wellesley                             | 4                                |                                  | 0.67                               | X                               |                                   |
| McDowell, M. F. |              |                             |                                |                                       | 1                                |                                  |                                    |                                 |                                   |
| McEwen, G. F.   | Stanford     | 11                          |                                | Scripps Institute                     | 11                               | 1                                | 0.25                               |                                 |                                   |
| McGinnis, C. S. | Penn         | 11                          |                                | New Brunswick                         | 11                               | 1                                | 0.25                               |                                 |                                   |
| McKeehan, L. W. | Minnesota    | 11                          | X                              | Minnesota                             | 11, 15                           | 2                                | 0.50                               |                                 |                                   |

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| <u>Name</u>        | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|--------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|----------------------------------|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| McKeon, T. F.      |              |                             |                                |                                       | 1                                |                                  |                                    |                                 |                                   |
| McLennan, J. C.    | Toronto      | 00                          | X                              | Toronto                               | 3                                |                                  | 0.18                               |                                 |                                   |
| MacFarlane, A.     | Edinburgh    | 78                          | X                              | Canada                                | 1                                |                                  | 0.05                               |                                 |                                   |
| MacGregory, A. C.  |              |                             |                                |                                       | 1                                |                                  |                                    |                                 |                                   |
| MacNutt, B.        | No           |                             |                                | Lehigh                                | 1                                | EN                               | 0.11                               |                                 |                                   |
| Macgregor, J. G.   |              |                             |                                |                                       | 1                                |                                  |                                    |                                 |                                   |
| Mackenzie, A. S.   | Hopkins      | 94                          |                                | Bryn Mawr; Dalhousie                  | 2                                |                                  | 0.10                               |                                 |                                   |
| Mackenzie, D.      | Hopkins      | 14                          |                                | Hopkins                               | 15                               | 1                                |                                    |                                 |                                   |
| Mahillon, V.       |              |                             |                                |                                       | 1                                |                                  |                                    |                                 |                                   |
| Mann, C. R.        | Berlin       | 95                          | X                              |                                       | 1                                |                                  | 0.05                               |                                 |                                   |
| March, H. W.       | Munich       | 11                          | X                              | Wisconsin                             | 1                                | M                                | 0.25                               |                                 |                                   |
| Marston, A.        | No           |                             |                                | Iowa State                            | 1                                | EN                               | 0.05                               |                                 |                                   |
| Marvin, C. F.      | No           |                             |                                | U.S. Weather Bureau                   | 1                                |                                  | 0.05                               |                                 |                                   |
| Marvin, H. H.      | Columbia     | 12                          |                                | Tufts                                 | 12                               | 1                                | 0.33                               |                                 |                                   |
| Matthews, C. P.    | Cornell      | 01                          |                                | Purdue                                | 1                                | EN                               | 0.06                               |                                 |                                   |
| Mayer, E. C.       |              |                             |                                |                                       | 15                               | 1                                |                                    |                                 |                                   |
| Mellencamp, F. J.  | Michigan     | 09                          |                                | Michigan; Milwaukee State Normal      | 1                                | C                                | 0.16                               |                                 |                                   |
| Mendenhall, C. E.  | Hopkins      | 98                          |                                | Wisconsin                             | 5                                |                                  | 0.29                               |                                 |                                   |
| Merrill, J. F.     | Hopkins      | 99                          |                                | Utah; Utah State School of Mines      | 2                                |                                  | 0.13                               |                                 |                                   |
| Meyer, J. F.       | Penn         | 04                          |                                | Westinghouse; Bureau of Standards     | 1                                |                                  | 0.09                               |                                 |                                   |
| Miller, J. W., Jr. | Columbia     | 01                          |                                | Lehigh                                | 1                                | M                                | 0.07                               |                                 |                                   |
| Millikan, R. A.    | Columbia     | 95                          | X                              | Chicago                               | 5                                |                                  | 0.25                               |                                 |                                   |
| Millis, F. E.      |              |                             |                                |                                       | 2                                |                                  | 0.05                               |                                 |                                   |
| Mills, J.          | No           |                             |                                | Colorado College; AT&T                | 1                                | EN                               | 0.14                               |                                 |                                   |
| Minchin, H. D.     | Michigan     | 06                          |                                | Rochester                             | 1                                |                                  | 0.11                               |                                 |                                   |
| Moffitt, G. W.     | Stanford     | 13                          |                                | Washington (St. Louis)                | 13, 15                           | 2                                | 2.00                               |                                 |                                   |

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| <u>Name</u>       | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>                    | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|-------------------|--------------|-----------------------------|--------------------------------|--|---|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| Molhy, F. A.      | Cornell      | 10                          | X                              | Indiana  | 12                                      | 4                                | 0.80                               |                                 |                                   |
| Moody, H. W.      | Chicago      | 12                          |                                | Lafayette; Williams; Mississippi<br>Agricultural College | 12                                      | 1                                | 0.33                               |                                 |                                   |
| Moore, B. E.      | Goettingen   | 07                          | X                              | Nebraska   | 12                                      | 6                                | 0.75                               | X                               |                                   |
| Moore, E. J.      | Chicago      | 13                          |                                | Berlin   | 12                                      | 1                                | 0.50                               |                                 |                                   |
| More, L. T.       | Hopkins      | 95                          |                                | Cincinnati   | 1                                       |                                  | 0.05                               |                                 |                                   |
| Morley, E. W.     | No           |                             |                                | Western Reserve  | 2                                       |                                  | 0.05                               |                                 |                                   |
| Morse, H. W.      | Leipzig      | 02                          | X                              | Harvard; Western Precipitation<br>Corporation            | 1                                       | C                                | 0.07                               |                                 |                                   |
| Moss, S. A.       | Cornell      | 03                          |                                | General Electric   | 5                                       | EN                               | 0.41                               | X                               |                                   |
| Milnor, J. W.     |              |                             |                                |  | 12                                      | 1                                |                                    |                                 |                                   |
| Nathanson, J. B.  | Illinois     | 16                          |                                | Illinois   | 13                                      | 1                                | 1.00                               |                                 |                                   |
| Nasmyth, G. W.    | Cornell      | 10                          |                                | Cornell  | 4                                       |                                  | 0.80                               | X                               |                                   |
| Nelms, W. S.      | Columbia     | 13                          |                                | Georgia School of Technology                             | 13                                      | 1                                | 0.50                               |                                 |                                   |
| Newkirk, B. L.    | Munich       | 02                          | X                              | Minnesota  | 12                                      | 1                                | 0.07                               |                                 |                                   |
| Nicholson, P. J.  | Hopkins      | 13                          |                                | St. Francis Xavier                                       | 14                                      | A                                | 0.50                               |                                 |                                   |
| Northrup, E. F.   | Hopkins      | 95                          |                                | Leeds & Northrup; Princeton                              | 3                                       |                                  | 0.15                               |                                 |                                   |
| * Northway, M. I. |              |                             |                                |  | 1                                       |                                  |                                    |                                 |                                   |
| Noyes, A. A.      | Leipzig      | 90                          | X                              | MIT  | 3                                       | C                                | 0.15                               |                                 |                                   |
| * Noyes, M. C.    | Cornell      | 96                          |                                | Minneapolis Academy                                      | 2                                       |                                  | 0.10                               |                                 |                                   |
| Nyswander, R. E.  | Cornell      | 08                          |                                | Denver   | 2                                       |                                  | 0.28                               |                                 |                                   |
| Ogura, K.         |              |                             |                                |  | 1                                       |                                  |                                    |                                 |                                   |
| Olunstead, L. B.  | No           |                             |                                | Bureau of Standards; USDA                                | 12                                      | 1                                | 0.33                               |                                 |                                   |
| Olshausen, G. R.  | Berlin       | 01                          | X                              | Cornell; Worcester; Bureau of<br>Standards               | 12,                                     | 2                                | 0.28                               |                                 |                                   |

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| <u>Name</u>           | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Principal</u><br><u>Field</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>Listed</u><br><u>1870-1893</u> |
|-----------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|---|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|
| Osborn, F. A.         | No           |                             |                                | Washington (Seattle)                  | 13, 12                                  | 2                                | 0.12                               |                                 |                                   |
| Palmer, A. de F.      | Brown        | 95                          |                                | Brown                                 | 5                                       |                                  | 0.25                               |                                 |                                   |
| Palmer, F., Jr.       | Harvard      | 13                          |                                | Haverford                             | 11,                                     | 2                                | 2.00                               |                                 |                                   |
| Parsons, L. A.        | Hopkins      | 02                          |                                | Penn College                          | 1                                       |                                  | 0.07                               |                                 |                                   |
| Patterson, G. W., Jr. | Munich       | 99                          | X                              | Michigan                              | 2                                       | EN                               | 0.13                               |                                 |                                   |
| Pedersen, F. M.       | NYU          | 05                          |                                | CCNY                                  | 1                                       |                                  | 0.10                               |                                 |                                   |
| Pegram, G. B.         | Columbia     | 03                          | X                              | Columbia                              | 2                                       |                                  | 0.16                               |                                 |                                   |
| Pender, H.            | Hopkins      | 01                          | X                              | New York City; MIT; Penn              | 4                                       | EN                               | 0.28                               |                                 |                                   |
| Pfund, A. H.          | Hopkins      | 06                          |                                | Hopkins                               | 5                                       |                                  | 0.56                               | X                               |                                   |
| Pierce, C. A.         | Cornell      | 08                          |                                | Cornell; Worcester                    | 4                                       |                                  | 0.57                               | X                               |                                   |
| Pomeroy, J. C.        | No           |                             |                                | Iowa State                            | 1                                       |                                  | 0.10                               |                                 |                                   |
| Porter, A. B.         | No           |                             |                                | Consultant; Importer                  | 1                                       |                                  | 0.05                               |                                 |                                   |
| Poucher, G. E.        |              |                             |                                |                                       | 1                                       |                                  |                                    |                                 |                                   |
| Prentiss, R. W.       | No           |                             |                                | Rutgers                               | 1                                       | A;M                              | 0.05                               |                                 |                                   |
| Proctor, C. A.        | Chicago      | 09                          |                                | Dartmouth                             | 2                                       |                                  | 0.33                               |                                 |                                   |
| Pyle, L.              | No           |                             |                                | Washington (St. Louis)                | 15                                      | 1                                | 0.13                               |                                 |                                   |
| Quick, R. W.          |              |                             |                                |                                       | 2                                       |                                  |                                    |                                 |                                   |
| Raman, C. V.          |              |                             |                                |                                       | 5                                       |                                  |                                    |                                 |                                   |
| Ramsey, R. R.         | Cornell      | 01                          |                                | Indiana                               | 3                                       |                                  | 0.21                               |                                 |                                   |
| Randall, H. M.        | Michigan     | 02                          |                                | Michigan                              | 2                                       |                                  | 0.13                               |                                 |                                   |
| Randolph, C. P.       | No           |                             |                                | General Electric                      | 13                                      | 1                                | 1.00                               |                                 |                                   |
| Rands, H. A.          |              |                             |                                |                                       | 1                                       |                                  |                                    |                                 |                                   |
| Rankin, R.            |              |                             |                                |                                       | 1                                       |                                  |                                    |                                 |                                   |
| Rapp, I. M.           | Chicago      | 15                          |                                | Ursinus; Oklahoma                     | 13                                      | 1                                | 1.00                               |                                 |                                   |
| Raymond, W. J.        | No           |                             |                                | Berkeley                              | 1                                       |                                  | 0.04                               |                                 |                                   |

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| Name                | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|---------------------|----------|---------------|------------------|-------------------------|--------------------|--------------------|----------------------|-------------------|---------------------|
| Reed, J. O.         | Jena     | 97            | X                | Michigan                | 1                  |                    | 0.05                 |                   |                     |
| Reese, H. M.        | Hopkins  | 00            |                  | Missouri                | 1                  |                    | 0.06                 |                   |                     |
| Reynolds, F. C.     | NYU      | 04            |                  | CCNY                    | 2                  | M                  | 0.18                 |                   |                     |
| Rhoad, E.           |          |               |                  |                         | 2                  |                    |                      |                   |                     |
| Rice, M. E.         | No       |               |                  | Kansas                  | 1                  | EN                 | 0.06                 |                   |                     |
| Richardson, O. W.   | London   | 04            | X                | Princeton               | 3                  |                    | 0.27                 |                   |                     |
| Richtmyer, F. K.    | Cornell  | 10            |                  | Cornell                 | 4                  |                    | 0.80                 | X                 |                     |
| Rieman, E. C.       |          |               |                  |                         | 11                 |                    |                      |                   |                     |
| Rimmington, E. C.   |          |               |                  |                         | 1                  |                    |                      |                   |                     |
| Roberts, E. C.      |          |               |                  |                         | 1                  |                    |                      |                   |                     |
| Robertson, J. K.    |          |               |                  |                         | 1                  |                    |                      |                   |                     |
| Robinson, P. E.     | Glessen  | 02            |                  | Princeton               | 1                  |                    | 0.06                 |                   |                     |
| Roebuck, J. R.      | Toronto  | 05            |                  | Wisconsin               | 3                  |                    | 0.30                 |                   |                     |
| Rogers, F. J.       | No       |               |                  | Cornell; Stanford       | 6                  |                    | 0.29                 |                   | X                   |
| Rogers, W. A.       |          |               |                  |                         | 1                  |                    |                      |                   |                     |
| Rollefson, C. J.    |          |               |                  |                         | 1                  |                    |                      |                   |                     |
| Roop, W. P.         |          |               |                  |                         | 13                 |                    |                      |                   |                     |
| Rosa, E. B.         | Hopkins  | 91            |                  | Bureau of Standards     | 5                  |                    | 0.24                 |                   | X                   |
| Ross, P. A.         | Stanford | 11            |                  | Stanford                | 1                  |                    | 0.25                 |                   |                     |
| Sano, S.            |          |               |                  |                         | 1                  |                    |                      |                   |                     |
| Saunders, F. A.     | Hopkins  | 99            |                  | Syracuse                | 1                  |                    | 0.06                 |                   |                     |
| Saurel, P.          | Bordeaux | 00            | X                | CCNY                    | 4                  | M                  | 0.27                 |                   |                     |
| Saxwer, A. H.       | Berkeley | 15            |                  | Utah College            | 14                 |                    | 0.06                 |                   |                     |
| Schaefer, C.        |          |               |                  |                         | 1                  |                    |                      |                   |                     |
| Shuddemagen, C.L.B. | Harvard  | 08            |                  | Texas                   | 1                  |                    | 0.14                 |                   |                     |

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| Name                | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment      | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|---------------------|-----------|---------------|------------------|------------------------------|--------------------|--------------------|----------------------|-------------------|---------------------|
| Severinghaus, W. L. | Columbia  | 14            |                  | Columbia                     | 13                 | 1                  | 1.00                 |                   |                     |
| Sharp, C. H.        | Cornell   | 95            | X                | Electrical Test Laboratories | 2                  |                    | 0.10                 |                   |                     |
| Sharpe, F. R.       | Cornell   | 07            |                  | Cornell                      | 12                 | 1                  | 0.13                 |                   |                     |
| Shaw, P. E.         |           |               |                  |                              | 1                  |                    |                      |                   |                     |
| Shea, D. W.         | Berlin    | 92            | X                | Catholic University          | 1                  |                    | 0.05                 |                   | X                   |
| Sheard, C.          | Princeton | 12            |                  | OSU                          | 3                  |                    | 1.00                 | X                 |                     |
| Shearer, J. S.      | Cornell   | 01            |                  | Cornell                      | 4                  |                    | 0.28                 |                   |                     |
| Sheldon, S.         | Wuerzburg | 88            | X                | Brooklyn Polytech            | 3                  |                    | 0.15                 |                   | X                   |
| Shook, G. A.        | Illinois  | 14            |                  | Illinois; Michigan           | 1                  |                    | 1.00                 |                   |                     |
| Shrader, J. E.      |           |               |                  |                              | 14, 15             | 2                  |                      |                   |                     |
| Sieg, L. P.         | Iowa      | 10            |                  | Iowa                         | 6                  |                    | 1.20                 | X                 |                     |
| Skinner, C. A.      | Berlin    | 99            | X                | Nebraska                     | 5                  |                    | 0.26                 |                   |                     |
| Slate, F.           | No        |               | X                | Berkeley                     | 6                  |                    | 0.30                 |                   |                     |
| Smallwood, J. C.    |           |               |                  |                              | 11                 | 1                  |                      |                   |                     |
| Smith, A. W.        | Harvard   | 06            |                  | OSU                          | 11,                | 2                  | 0.22                 |                   |                     |
| Smith, C. M.        | No        |               | X                | Purdue                       | 14                 | 1                  | 0.06                 |                   |                     |
| Smith, J. H.        | No        |               |                  | Pittsburgh                   | 1                  | EN                 | 0.05                 |                   |                     |
| Smith, N. F.        | Chicago   | 09            |                  | Olivet; Centre               | 2                  |                    | 0.33                 |                   |                     |
| Snow, B. F.         | Berlin    | 92            | X                | Wisconsin                    | 1                  |                    | 0.05                 |                   |                     |
| Snow, C.            | Wisconsin | 14            |                  | Brigham Young; Idaho         | 13                 | 1                  | 1.00                 |                   |                     |
| Somermeier, E. E.   | No        |               |                  | OSU                          | 12, 13             | 2                  | 0.15                 |                   |                     |
| Somerville, A. A.   | Cornell   | 10            |                  | U.S. Rubber Company          | 11,                | 2                  | 0.40                 |                   |                     |
| Spence, B. J.       | Princeton | 09            |                  | North Dakota                 | 3                  |                    | 0.50                 |                   |                     |
| Stamper, W. R.      |           |               |                  |                              | 1                  |                    |                      |                   |                     |
| Stearns, H. D.      | No        |               | X                | Stanford                     | 1                  |                    | 0.04                 |                   |                     |

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| Name               | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                    | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|--------------------|-----------|---------------|------------------|--|--------------------|--------------------|----------------------|-------------------|---------------------|
| Steinmetz, C. P.   | No        |               | X                | General Electric                           | 1                  | EN                 | 0.04                 |                   |                     |
| Stephenson, E. B.  | Illinois  | 10            |                  | North Dakota                               | 1                  |                    | 0.20                 |                   |                     |
| Stevens, J. S.     | No        |               |                  | Maine                                      | 5                  |                    | 0.24                 |                   |                     |
| Stewart, O. M.     | Cornell   | 97            |                  | Missouri                                   | 5                  |                    | 0.28                 |                   |                     |
| Stifler, W. W.     | Illinois  | 11            |                  | Columbia                                   | 11, 2              |                    | 0.50                 |                   |                     |
| * Stone, L.        | Chicago   | 97            |                  | Vassar; School for American<br>Girls, Rome | 2                  |                    | 0.11                 |                   |                     |
| Stone, J. S.       | No        |               |                  | Industrial Laboratories                    | 1                  | EN                 | 0.06                 |                   |                     |
| Story, W. E., Jr.  | Leipzig   | 75            | X                | Clark                                      | 1                  | M                  | 0.05                 |                   |                     |
| Strong, W. W.      | Hopkins   | 08            |                  | Hopkins; Pittsburgh; Industry              | 2                  |                    | 0.28                 |                   |                     |
| Studley, C. K.     |           |               |                  |  | 1                  |                    |                      |                   |                     |
| Stuhlmann, O., Jr. | Princeton | 11            |                  | Penn                                       | 13 2               |                    | 0.50                 |                   |                     |
| Suydam, V. A.      | Columbia  | 17            |                  | Industrial Laboratories                    | 15 1               | C                  | 1.00                 |                   |                     |
| Switzer, J. A.     |           |               |                  |  | 1                  |                    |                      |                   |                     |
| Tate, J. T.        | Berlin    | 14            | X                | Nebraska                                   | 12 1               |                    | 1.00                 |                   |                     |
| Tatnall, R. R.     | Hopkins   | 95            |                  | Northwestern                               | 1                  |                    | 0.05                 |                   |                     |
| Taylor, H. O.      | Cornell   | 13            |                  | MIT; Harvard                               | 13, 15 2           |                    | 2.00                 |                   |                     |
| Taylor, S. N.      | Clark     | 96            | X                | Purdue; Syracuse; Pittsburgh;<br>Goucher   | 2                  |                    | 0.11                 |                   |                     |
| Terry, E. M.       | Wisconsin | 10            |                  | Wisconsin                                  | 2                  |                    | 0.40                 |                   |                     |
| Thiessen, A. H.    | No        |               |                  | U.S. Weather Bureau                        | 1                  | ME                 | 0.06                 |                   |                     |
| Thomas, P.         |           |               |                  |  | 1                  |                    |                      |                   |                     |
| Thompson, G. E.    | Cornell   | 13            |                  | Iowa State                                 | 15 1               |                    | 0.50                 |                   |                     |
| Thompson, J. O.    | Strasburg | 91            | X                | Amherst                                    | 2                  |                    | 0.10                 |                   | X                   |
| Threlfall, R.      |           |               |                  |  | 3                  |                    |                      |                   |                     |
| Thwing, C. B.      | Bonn      | 94            | X                | Knox; Syracuse; Industry                   | 1                  |                    | 0.05                 |                   | X                   |

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| Name                | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment             | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|---------------------|-----------|---------------|------------------|-------------------------------------|--------------------|--------------------|----------------------|-------------------|---------------------|
| Todd, D. P.         |           |               |                  |                                     | 1                  |                    |                      |                   | X                   |
| Tolman, R. C.       | MIT       | 10            | X                | Cincinnati; Berkeley                | 5                  | C                  | 1.00                 | X                 |                     |
| Tool, A. Q.         | Berlin    | 14            | X                | Bureau of Standards                 | 1                  |                    | 1.00                 |                   |                     |
| Trowbridge, C. C.   | No        |               |                  | Columbia                            | 4                  |                    | 0.24                 |                   |                     |
| Tsuruta, K.         |           |               |                  |                                     | 2                  |                    |                      |                   |                     |
| Tufts, F. L.        | Columbia  | 97            |                  | Columbia                            | 3                  |                    | 0.25                 |                   |                     |
| Tugman, O.          | Cornell   | 09            |                  | Bureau of Standards; Industry       | 1                  |                    | 0.16                 |                   |                     |
| Turnbull, W. R.     |           |               |                  |                                     | 1                  |                    |                      |                   |                     |
| Uhler, H. S.        | Hopkins   | 05            |                  | Yale                                | 1                  |                    | 0.10                 |                   |                     |
| Van Aubel, E.       |           |               |                  |                                     | 1                  |                    |                      |                   |                     |
| Veazey, J. A.       |           |               |                  |                                     | 1                  |                    |                      |                   |                     |
| Vincent, J. H.      |           |               |                  |                                     | 1                  |                    |                      |                   |                     |
| Vreeland, F. K.     | No        |               |                  | Industry                            | 1                  |                    | 0.07                 |                   |                     |
| Wadsworth, F. L. O. | No        |               |                  | Various Observatories; Laboratories | 1                  |                    | 0.05                 |                   |                     |
| Waggener, C. W.     | Cornell   | 09            |                  | West Virginia                       | 5                  |                    | 0.83                 | X                 |                     |
| Waldner, C. W.      | Hopkins   | 98            |                  | Bureau of Standards                 | 4                  |                    | 0.24                 |                   |                     |
| Waterman, F. A.     | Princeton | 96            |                  | Smith                               | 1                  |                    | 0.05                 |                   |                     |
| Watson, F. R.       | Cornell   | 02            |                  | Illinois                            | 3                  |                    | 0.23                 |                   |                     |
| Watts, O. P.        | Wisconsin | 05            |                  | Wisconsin                           | 11 1               | C                  | 0.10                 |                   |                     |
| Weber, H. S.        |           |               |                  |                                     | 2                  |                    |                      |                   |                     |
| Webb, H. S.         |           |               |                  |                                     | 1                  | EN                 | 0.09                 |                   |                     |
| Webb, H. W.         | Columbia  | 09            |                  | Columbia                            | 2                  |                    | 0.33                 |                   |                     |
| Webster, A. G.      | Berlin    | 90            | X                | Clark                               | 2                  |                    | 0.10                 |                   |                     |
| Webster, D. L.      | Harvard   | 13            |                  | Harvard                             | 15 1               |                    | 0.50                 |                   |                     |
| Weeks, P. T.        | Cornell   | 17            |                  | Cornell                             | 15 1               |                    | 1.00                 |                   |                     |
| Weinberg, B.        |           |               |                  |                                     | 1                  |                    |                      |                   |                     |

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| Name             | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment    | Articles<br>Year # | Principal<br>Field | Productivity<br>Rate | High<br>Producers | Listed<br>1870-1893 |
|------------------|-----------|---------------|------------------|----------------------------|--------------------|--------------------|----------------------|-------------------|---------------------|
| Weisberg, L.     |           |               |                  |                            | 15                 | 1                  |                      |                   |                     |
| Wells, R. T.     | Clark     | 05            |                  | Industry                   | 3                  | EE                 | 0.30                 |                   |                     |
| Weniger, W.      | Wisconsin | 08            |                  | Oregon College             | 1                  |                    | 0.14                 |                   |                     |
| Wenner, F.       | Penn      | 09            |                  | Bureau of Standards        | 1                  |                    | 0.16                 |                   |                     |
| von Wesedouk, K. |           |               |                  |                            | 1                  |                    |                      |                   |                     |
| Weston, C. P.    |           |               |                  |                            | 1                  |                    |                      |                   |                     |
| Whitehead, J. B. | Hopkins   | 02            |                  | Hopkins                    | 1                  | EN                 | 0.08                 |                   |                     |
| Whitford, A. E.  |           |               |                  |                            | 12                 | 1                  |                      |                   |                     |
| Whitman, F. P.   | No        |               |                  | Western Reserve            | 1                  |                    | 0.05                 |                   |                     |
| Willard, H. R.   | Yale      | 12            |                  | Maine                      | 1                  |                    | 0.33                 |                   |                     |
| Williams, E. H.  | Illinois  | 10            |                  | Illinois                   | 4                  |                    | 0.80                 | X                 |                     |
| Williams, H. B.  |           |               |                  |                            | 14                 | 1                  |                      |                   |                     |
| Williams, N. H.  | Michigan  | 12            |                  | Michigan                   | 3                  |                    | 1.00                 | X                 |                     |
| Wills, A. P.     | Clark     | 97            | X                | Columbia                   | 5                  |                    | 0.28                 |                   |                     |
| Wilson, H. A.    | London    | 00            | X                | McGill; Rice               | 14                 | 1                  | 0.07                 |                   |                     |
| Winchester, G.   | Chicago   | 07            |                  | Washington & Jefferson     | 14                 | 2                  | 0.25                 |                   |                     |
| Wind, C. H.      |           |               |                  |                            | 2                  |                    |                      |                   |                     |
| Wold, P. I.      | Cornell   | 15            |                  | American Indemnity College | 2                  |                    | 2.00                 |                   |                     |
| Woodman, L. E.   | Columbia  | 10            |                  | Maine                      | 1                  |                    | 0.20                 |                   |                     |
| Woodrow, J. W.   | Yale      | 13            |                  | Illinois; AT&T             | 4                  |                    | 2.00                 | X                 |                     |
| Woodruff, E. C.  | Michigan  | 00            |                  | James Millikin             | 1                  |                    | 0.07                 |                   |                     |
| Worthing, A. G.  | Michigan  | 11            |                  | NELA                       | 5                  |                    | 1.25                 | X                 |                     |
| Wright, J. R.    | Chicago   | 11            |                  | University of Philippines  | 11, 15             | 2                  | 0.50                 |                   |                     |
| Zahn, A. F.      | Hopkins   | 98            |                  | Catholic University        | 1                  | EN                 | 0.06                 |                   |                     |
| Zeller, C. A.    |           |               |                  |                            | 1                  |                    |                      |                   |                     |
| Crew, Henry      |           |               |                  |                            | 0                  |                    |                      |                   |                     |

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## APPENDIX V

## PRODUCTIVE MATHEMATICIANS

Four or More Articles

1878 - 1890

| Name             | Place   | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment   | Total<br>Articles | Principal<br>Field | Listed<br>1891-1915 | Productivity<br>Rate |
|------------------|---------|---------------|------------------|---|-------------------|--------------------|---------------------|----------------------|
| Cole, F. N.      | Harvard | 86            | X                | Michigan  | 4                 |                    | X                   | 1.00                 |
| Craig, T.        | Hopkins | 78            |                  | Hopkins   | 18                |                    | X                   | 1.50                 |
| Echols, W. H.    | No      |               |                  | Charlottesville, Virginia; Mining<br>Engineer; Missouri School of Mines | 4                 |                    | X                   | 1.33                 |
| Eddy, H. T.      | Cornell | 70            | X                | Cincinnati  | 4                 |                    |                     | 0.33                 |
| Fields, J. C.    | Hopkins | 87            | X                | Hopkins   | 4                 |                    | X                   | 1.33                 |
| Franklin, F.     | Hopkins | 80            |                  | Hopkins   | 16                |                    | X                   | 1.60                 |
| Heal, Wm. E.     | No      |               |                  | Marion, Indiana   | 4                 |                    | X                   |                      |
| Hill, G. W.      | No      |               |                  | Columbia  | 8                 |                    | X                   | 0.67                 |
| Howe, H. A.      | Boston  | 84            |                  | Denver, Colorado University Park  | 4                 | A                  |                     | 0.67                 |
| Johnson, W. W.   | No      |               |                  | Naval Academy (Annapolis, Maryland)                                     | 13                |                    | X                   | 1.08                 |
| Kummell, C. H.   |         |               |                  | OSU   | 5                 |                    | X                   |                      |
| McClintock, E.   | No      |               |                  | Life Insurance Companies  | 7                 |                    | X                   | 0.58                 |
| Mitchell, O. H.  |         |               |                  | Hopkins   | 4                 |                    |                     |                      |
| Newcomb, S.      | No      |               |                  | U.S. Navy; Hopkins  | 4                 | A                  |                     | 0.33                 |
| Peirce, C. S.    | No      |               |                  | USCGS   | 6                 |                    |                     | 0.50                 |
| Rowland, H.      | No      |               |                  | Hopkins   | 5                 |                    |                     | 0.42                 |
| Stone, O.        | No      |               |                  | Cincinnati Observatory; UVA   | 9                 | A                  | X                   | 0.75                 |
| Story, W. E.     | Leipzig | 75            | X                | Hopkins; Clark  | 10                |                    | X                   | 0.83                 |
| Stringham, W. F. | Hopkins | 80            |                  | Berkeley; Hopkins   | 4                 |                    | X                   | 0.40                 |
| Sylvester, J. J. | No      |               |                  | Hopkins   |                   |                    |                     |                      |
| Thornton, W. M.  | No      |               |                  | UVA   | 4                 | A;P                |                     |                      |
| Woodward, R. S.  | No      |               |                  | USCGS; USGS   | 5                 |                    |                     | 0.45                 |

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## APPENDIX VI

## LESS PRODUCTIVE MATHEMATICIANS

Three or Fewer Articles

1878 - 1890

| Name            | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment      | Articles<br>Year # | Principal<br>Field | Listed<br>1891-1915 | Productivity<br>Rate | High<br>Producers |
|-----------------|------------|---------------|------------------|------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Alvord, B.      | No         |               |                  | U.S. Army                    | 82 1               |                    |                     |                      |                   |
| Baker, M.       | No         |               |                  | USGS                         | 85 1               | G                  |                     | 0.08                 |                   |
| Barcroft, D.    |            |               |                  |                              | 88 1               |                    |                     |                      |                   |
| Bolza, Oskar    | Goettingen | 86            | X                | Hopkins; Clark               | 85,88 2            |                    | X                   | 0.50                 | X                 |
| Burr, Wm. H.    | No         |               |                  | RPI                          | 79 1               | CE                 |                     | 0.09                 |                   |
| Chace, A. B.    |            |               |                  | R.I.                         | 79 1               |                    |                     |                      |                   |
| Chapman, C. H.  | Hopkins    |               |                  | Hopkins                      | 88 1               |                    | X                   |                      |                   |
| Daniels, A. L.  | Princeton  | 86            | X                | Hopkins                      |                    |                    |                     | 0.75                 | X                 |
| Davis, D.E.W.   | Hopkins    | 84            |                  | Hopkins - Student            | 82 1               |                    | X                   | 0.16                 |                   |
| Dixon, T. S. E. |            |               |                  | Chicago                      | 78 1               |                    |                     |                      |                   |
| Durfee, W. P.   | Hopkins    | 83            |                  | Hopkins; Berkeley; Hobart    | 3                  |                    |                     | 0.43                 | X                 |
| Ely, G. S.      |            |               |                  | Hopkins                      | 3                  |                    |                     |                      |                   |
| Engler, G. S.   |            |               |                  | Hopkins                      | 78 1               |                    | X                   |                      |                   |
| Fine, H. B.     | Leipzig    | 85            | X                | Princeton                    | 3                  |                    | X                   | 0.60                 | X                 |
| Flint, A. S.    | No         |               |                  | U.S. Navy Observatory        | 87,88 2            | A                  |                     | 0.22                 |                   |
| Fort, T.        |            |               |                  |                              | 1                  |                    | X                   |                      |                   |
| Freeland, F.    |            |               |                  | University of Pennsylvania   | 80 1               |                    |                     |                      |                   |
| Gibbs, J. W.    | Yale       | 63            |                  | Yale                         | 79 1               |                    |                     | 0.08                 |                   |
| Gorton, W.C.L.  | Yes        |               |                  | Woman's College of Baltimore | 88 1               |                    | X                   |                      |                   |
| Graves, R. H.   |            |               |                  |                              | 87,88 2            |                    |                     |                      |                   |
| Hagen, J. G.    | No         |               |                  | Georgetown                   | 82 1               |                    | X                   | 0.08                 |                   |

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## APPENDIX VI.

(Continued)

| Name             | Place         | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment         | Articles<br>Year # | Principal<br>Field | Listed<br>1891-1915 | Productivity<br>Rate | High<br>Producers |
|------------------|---------------|---------------|------------------|---------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Hale, A. W.      |               |               |                  |                                 | 82 1               | A                  |                     |                      |                   |
| Hall, A.         | No            |               |                  | U.S. Navy                       | 3                  |                    |                     | 0.25                 |                   |
| Hall, A., Jr.    | Yale          | 89            |                  | U.S. Navy, Observatory          | 84 1               | A                  |                     | 1.00                 |                   |
| Hall, E. H.      | Hopkins       | 80            |                  | Harvard                         | 79 1               | P                  |                     | 0.10                 |                   |
| Halstead, G. B.  | Hopkins       | 79            |                  | University of Texas             | 78,84 2            |                    |                     | 0.18                 |                   |
| Harris, R. A.    | Cornell       | 88            |                  | USCGS                           | 88,90 2            |                    | X                   | 2.00                 | X                 |
| Hathaway, A. S.  | No            |               |                  | Cornell; Hopkins                | 2                  |                    | X                   | 0.28                 |                   |
| Heaton, H.       |               |               |                  | Atlantic, Iowa                  | 84 1               |                    |                     |                      |                   |
| Holman, M. L.    |               |               |                  |                                 | 78 1               |                    |                     |                      |                   |
| Hyde, E. W.      | No            |               |                  | Cincinnati                      | 80,84 2            |                    |                     | 0.16                 |                   |
| Jacobus, D. S.   | No            |               |                  | Stevens Institute of Technology | 88,90 2            | ME;P               |                     | 0.20                 |                   |
| Jenkins, M.      |               |               |                  |                                 | 88 1               |                    |                     |                      |                   |
| Kendall, O. H.   |               |               |                  | Penn                            | 78 1               |                    |                     |                      |                   |
| * Ladd, C.       | No            |               |                  | Hopkins                         | 79,80 2            |                    |                     | 0.16                 |                   |
| Lane, A. V.      | Yes           |               |                  | Texas Banker                    | 86 1               |                    |                     |                      |                   |
| McCulloch, J. F. |               |               |                  | University of Michigan          | 88 2               |                    |                     |                      |                   |
| McElroy, G. W.   |               |               |                  |                                 | 87 1               |                    |                     |                      |                   |
| McFarlane, A.    | Edinburgh     | 78            | X                | University of Texas             | 87 1               |                    |                     | 0.08                 |                   |
| McMahon, Jr.     | No            |               | X                | Cornell                         | 88,89 2            |                    | X                   | 0.33                 | X                 |
| Mallet, J. W.    | Goettingen    | 82            | X                | Southern Universities; UVA      | 78 1               | C                  |                     | 0.08                 |                   |
| Meech, L. N.     |               |               |                  | Norwich, Connecticut            | 84,87 2            |                    |                     |                      |                   |
| Little, C. N.    | Yale          | 85            |                  | Nebraska                        | 86 1               |                    | X                   | 0.20                 |                   |
| Moore, E. H.     | Yale          | 85            | X                | Yale; Northwestern              | 3                  |                    | X                   | 0.60                 | X                 |
| Newson, H. B.    | Ohio Wesleyan | 91            | X                | Kansas                          | 89 1               |                    | X                   | 1.00                 |                   |
| Nicholson, J. W. | No            |               |                  | LSU                             | 84 1               |                    |                     | 0.08                 |                   |
| Oliver, J. E.    | No            |               |                  | Cornell                         | 3                  |                    |                     |                      |                   |

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## APPENDIX VI

(Continued)

| <u>Name</u>       | <u>Place</u> | <u>Ph. D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1891-1915</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> |
|-------------------|--------------|------------------------------|--------------------------------|---------------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|---------------------------------|
| Page, J. M.       | Leipzig      | 87                           | X                              | UVA                                   | 88                               | 1                                | X                                 | 0.33                               |                                 |
| Peirce, B.        | No           |                              |                                | Harvard; USCGS                        | 81                               | 1                                |                                   | 0.50                               |                                 |
| Risteen, A. D.    |              |                              |                                | USCGS; Industry                       | 87                               | 1                                |                                   |                                    |                                 |
| Sawin, A. M.      | No           |                              |                                | Wyoming                               | 84                               | 1                                |                                   |                                    |                                 |
| Schaeberle, J. M. | No           |                              |                                | Various Observatories                 | 87                               | 1                                | A                                 | 0.09                               |                                 |
| * Scott, C. A.    | London       | 85                           | X                              | Bryn Mawr                             | 3                                |                                  |                                   | 0.60                               | X                               |
| Smith, C. H.      |              |                              |                                | Bowdoin                               | 84                               | 1                                |                                   |                                    |                                 |
| Smith, E. B.      |              |                              |                                |                                       | 84                               | 1                                |                                   |                                    |                                 |
| Taber, H.         | Hopkins      | 88                           |                                | Clark                                 | 90                               | 1                                | X                                 | 0.50                               |                                 |
| Thompson, H. D.   | Princeton    | 89                           |                                |                                       | 87                               | 1                                | X                                 | 1.00                               |                                 |
|                   | Goettingen   | 92                           | X                              |                                       |                                  |                                  |                                   |                                    |                                 |
| Van Velzer, C. A. | Hillsdale    | 83                           |                                | Wisconsin                             | 84                               | 1                                |                                   | 0.14                               |                                 |
| Webb, J. B.       | No           |                              | X                              | Stevens; Illinois; Cornell            | 88                               | 1                                |                                   | 0.08                               |                                 |
| Whitcom, A. W.    |              |                              |                                | Sheboygan Falls, Wisconsin            | 80                               | 1                                |                                   |                                    |                                 |
| Ziwet, A.         | No           |                              | X                              | USCGS; Michigan                       | 85                               | 1                                |                                   | 0.09                               |                                 |

## APPENDIX VII

## PRODUCTIVE MATHEMATICIANS

Eight or More Articles

1891 - 1915

| <u>Name</u>       | <u>Place</u>   | <u>Ph. D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Total</u><br><u>Articles</u> | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1878-1890</u> | <u>Productivity</u><br><u>Rate</u> |
|-------------------|----------------|------------------------------|--------------------------------|---------------------------------------|---------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| Birkhoff, G. D.   | Chicago        | 07                           |                                | Princeton                             | 14                              |                                  |                                   | 1.75                               |
| Blichfeldt, H. F. | Leipzig        | 98                           | X                              | Stanford                              | 16                              |                                  |                                   | 0.94                               |
| Bliss, G. A.      | Chicago        | 00                           | X                              | Chicago                               | 16                              |                                  |                                   | 1.07                               |
| Bolza, O.         | Goettingen     | 86                           | X                              | Chicago                               | 13                              |                                  | X                                 | 0.54                               |
| Bocher, M.        | Goettingen     | 91                           | X                              | Harvard                               | 29                              |                                  |                                   | 1.21                               |
| Brown, E. W.      | Cambridge      | 97                           | X                              | Haverford; Yale                       | 10                              |                                  |                                   | 0.55                               |
| Carmichael, R. D. | No             |                              |                                | Princeton                             | 14                              |                                  |                                   | 1.75                               |
| Chessin, A. S.    | St. Petersburg | 89                           | X                              | Hopkins; Washington University        | 12                              |                                  |                                   | 0.50                               |
| Coble, A. B.      | Hopkins        | 02                           |                                | Hopkins                               | 10                              |                                  |                                   | 0.77                               |
| Coolidge, J. L.   | Bonn           | 04                           | X                              | Harvard                               | 11                              |                                  |                                   | 1.00                               |
| Dickson, L. E.    | Chicago        | 96                           | X                              | Berkeley; Texas; Chicago              | 70                              |                                  |                                   | 3.68                               |
| Echols, W. H.     | No             |                              |                                | UVA                                   | 15                              |                                  | X                                 | 0.625                              |
| Eiesland, J. A.   | Hopkins        | 98                           |                                | Annapolis; West Virginia              | 9                               |                                  |                                   | 0.53                               |
| Eisenhart, L. P.  | Hopkins        | 00                           |                                | Princeton                             | 13                              |                                  |                                   | 0.87                               |
| Emch, A.          | Kansas         | 95                           | X                              | Colorado; Switzerland                 | 13                              |                                  |                                   | 0.65                               |
| Engler, C. S.     |                |                              |                                | Hopkins                               | 9                               |                                  | X                                 |                                    |
| Fite, W. B.       | Cornell        | 01                           |                                | Cornell; Columbia                     | 8                               |                                  |                                   | 0.57                               |
| Gronwall, T. H.   | Upsala         | 98                           | X                              | Princeton                             | 8                               |                                  |                                   | 0.47                               |
| Hedrick, E. R.    | Goettingen     | 01                           | X                              | Missouri                              | 8                               |                                  |                                   | 0.57                               |
| Huntington, E. V. | Strasburg      | 01                           | X                              | Harvard                               | 9                               |                                  |                                   | 0.76                               |
| Hutchinson, J. I. | Chicago        | 96                           |                                | Cornell                               | 9                               |                                  |                                   | 0.47                               |

## APPENDIX VII.

(Continued)

| <u>Name</u>        | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Total</u><br><u>Articles</u> | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1878-1890</u> | <u>Productivity</u><br><u>Rate</u> |
|--------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|---------------------------------|----------------------------------|-----------------------------------|------------------------------------|
| Kasner, E.         | Columbia     | 97                          | X                              | Columbia                              | 18                              |                                  |                                   | 1.00                               |
| Lehmer, D. N.      | Chicago      | 00                          |                                | Berkeley                              | 9                               |                                  |                                   | 0.60                               |
| Lovett, E. O.      | Leipzig      | 96                          | X                              | Princeton                             | 14                              |                                  |                                   | 0.74                               |
|                    | Virginia     | 95                          |                                |                                       |                                 |                                  |                                   |                                    |
| McClintock, E.     | No           |                             | X                              | Life Insurance                        | 8                               |                                  | X                                 | 0.33                               |
| Manning, W. A.     | Stanford     | 04                          | X                              |                                       | 10                              |                                  |                                   | 0.91                               |
| Metzler, W. H.     | Clark        | 92                          |                                | Syracuse                              | 12                              |                                  |                                   | 0.50                               |
| Miller, G. A.      | Cumberland   | 93                          | X                              | Stanford; Illinois                    | 58                              |                                  |                                   | 2.64                               |
| Moore, E. H.       | Yale         | 85                          | X                              | Chicago                               | 14                              |                                  | X                                 | 0.58                               |
| Moulton, F. R.     | Chicago      | 99                          |                                | Chicago                               | 8                               |                                  |                                   | 0.50                               |
| Osgood, W. F.      | Erlangen     | 90                          | X                              | Harvard                               | 17                              |                                  |                                   | 0.71                               |
| Porter, M. B.      | Harvard      | 97                          |                                | Texas                                 | 9                               |                                  |                                   | 0.50                               |
| Saurel, P.         | Bordeaux     | 00                          | X                              | CCNY                                  | 9                               |                                  |                                   | 0.60                               |
| Shaw, J. B.        | Purdue       | 93                          |                                | Kenyon; Millikin; Illinois            | 9                               |                                  |                                   | 0.41                               |
| Snyder, V.         | Goettingen   | 94                          | X                              | Cornell                               | 25                              |                                  |                                   | 1.19                               |
| Study, E.          |              |                             |                                |                                       | 8                               |                                  |                                   |                                    |
| Van Vleck, E. B.   | Goettingen   | 93                          | X                              | Wesleyan; Wisconsin                   | 18                              |                                  |                                   | 0.82                               |
| Veblen, O.         | Chicago      | 03                          |                                | Princeton                             | 13                              |                                  |                                   | 1.08                               |
| Wedderburn, J.H.M. | Edinburgh    | 08                          |                                | Princeton                             | 8                               |                                  |                                   | 1.14                               |
| White, H. S.       | Goettingen   | 90                          | X                              | Northwestern; Vassar                  | 12                              |                                  |                                   | 0.50                               |
| Wilczynsky, E. J.  | Berlin       | 97                          | X                              | Chicago                               | 24                              |                                  |                                   | 1.33                               |
| Wilson, E. B.      | Yale         | 01                          | X                              | Yale; MIT                             | 12                              |                                  |                                   | 0.86                               |

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## APPENDIX VIII

## LESS PRODUCTIVE MATHEMATICIANS

Seven or Fewer Articles

1891 - 1915

| <u>Name</u>      | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1878-1890</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> |
|------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|--------------------------------|----------------------------------|-----------------------------------|------------------------------------|---------------------------------|
| Akers, O. P.     | Cornell      | 05                          |                                | Allegheny                             | 06                             | 1                                |                                   | 0.10                               |                                 |
| Alexander, J. W. | Princeton    | 15                          | X                              | Princeton                             | 15                             | 2                                |                                   | 2.00                               |                                 |
| Allardice, R. E. | No           |                             |                                | Stanford                              |                                | 4                                |                                   | 0.16                               |                                 |
| Allen, R. B.     | Clark        | 05                          |                                | Clark; Kenyon                         | 08                             | 1                                |                                   | 0.10                               |                                 |
| Alvord, B.       | No           |                             |                                | U.S. Army                             | 01, 04                         | 2                                |                                   |                                    |                                 |
| * Bacon, C. L.   | Hopkins      | 11                          |                                | Goucher                               | 13                             | 1                                | X                                 | 0.25                               |                                 |
| Baker, A. L.     | Lafayette    | 89                          |                                | Brooklyn High School                  | 96, 99                         | 2                                |                                   | 0.08                               |                                 |
| Baker, R. P.     | Chicago      | 10                          | X                              | Iowa                                  | 13                             | 1                                |                                   | 0.20                               |                                 |
| * Barney, I.     | Yale         | 11                          |                                | Smith                                 | 14                             | 1                                |                                   | 0.25                               |                                 |
| Barnurn, H. H.   |              |                             |                                | Princeton                             | 10                             | 1                                |                                   |                                    |                                 |
| Barrow, D. F.    |              |                             |                                | Austin, Texas                         | 15                             | 1                                |                                   |                                    |                                 |
| Bateman, H.      | Hopkins      | 13                          | X                              | Bryn Mawr; Hopkins                    |                                | 6                                |                                   | 3.00                               | X                               |
| Bates, W. H.     | Chicago      | 10                          |                                | Purdue                                | 11                             | 1                                |                                   | 0.20                               |                                 |
| Beal, F. W.      | Princeton    | 11                          |                                | Pennsylvania; Penn State              | 13                             | 1                                |                                   | 0.25                               |                                 |
| Beetle, R. D.    | Princeton    | 14                          |                                | Dartmouth                             | 14, 15                         | 2                                |                                   | 2.00                               |                                 |
| Bennett, A. A.   | Princeton    | 15                          | X                              | Texas                                 | 15                             | 1                                |                                   | 1.00                               |                                 |
| Bennett, E. R.   |              |                             |                                | Illinois                              | 12                             | 1                                |                                   |                                    |                                 |
| Berry, W. J.     | No           |                             |                                | Brooklyn Polytech                     | 11                             | 1                                |                                   | 0.25                               |                                 |
| Bill, E. G.      | Yale         | 08                          | X                              | Dartmouth                             | 12                             | 1                                |                                   | 0.14                               |                                 |
| Blake, E. M.     | Columbia     | 93                          |                                | Arizona                               |                                | 4                                |                                   | 0.18                               |                                 |
| Bohannon, R. D.  | No           |                             | X                              | OSU                                   | 97                             | 1                                |                                   | 0.04                               |                                 |

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## APPENDIX VIII

(Continued)

| Name              | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment           | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|-------------------|-----------|---------------|------------------|-----------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Borger, R. L.     | Chicago   | 07            |                  | Missouri; Illinois; Ohio (Athens) | 10 1               |                    |                     | 0.13                 |                   |
| Bouton, C. L.     | Leipzig   | 98            | X                | Harvard                           | 5                  |                    |                     | 0.29                 |                   |
| Boy*, P. P.       | Cornell   | 11            |                  | Kentucky                          | 12 1               |                    |                     | 0.25                 |                   |
| Boyd, J. H.       | Princeton | 92            | X                | Chicago - Attorney                | 4                  |                    |                     | 0.17                 |                   |
| Bradshaw, J. W.   | Strasburg | 04            | X                | Michigan                          | 02 1               |                    |                     | 0.09                 |                   |
| Brenke, W. C.     | Harvard   | 07            |                  | Nebraska                          | 07, 12 2           |                    |                     | 0.25                 |                   |
| Bromwich, T. J.   |           |               |                  |                                   | 03, 05 2           |                    |                     |                      |                   |
| Brown, T. H.      | Yale      | 13            |                  | Brown                             | 15 1               |                    |                     | 0.50                 |                   |
| Brown, W. V.      | Stevens   | 89            |                  | DePauw                            | 92 1               | A                  |                     | 0.04                 |                   |
| Buchanan, H. E.   | Chicago   | 09            |                  | Tennessee                         | 08 1               |                    |                     | 0.16                 |                   |
| Burgess, H. T.    | Yale      | 09            |                  | Wisconsin                         | 12 1               |                    |                     | 0.16                 |                   |
| Burns, J. R.      |           |               |                  |                                   | 15 1               |                    |                     |                      |                   |
| Byerly, W. E.     | Harvard   | 73            |                  | Harvard                           | 09, 11 2           |                    |                     | 0.08                 |                   |
| Cajori, F.        | Tulane    | 94            | X                | Colorado College                  | 3                  |                    |                     | 0.14                 |                   |
| Camp, B. H.       | Yale      | 11            |                  | Wesleyan                          | 13, 14 2           |                    |                     | 0.50                 |                   |
| Campbell, J. E.   |           |               |                  |                                   | 00 1               |                    |                     |                      |                   |
| Candy, A. L.      | Nebraska  | 98            |                  | Nebraska                          | 95 1               |                    |                     | 0.06                 |                   |
| Carpenter, A. F.  | Chicago   | 15            |                  | Washington (Seattle)              | 13, 15 2           |                    |                     | 2.00                 |                   |
| Carver, W. B.     | Hopkins   | 04            |                  | Cornell                           | 05, 09 2           |                    |                     | 0.18                 |                   |
| Chapman, C. H.    |           |               |                  |                                   | 91, 92 2           |                    |                     |                      |                   |
| Chittenden, E. W. | Chicago   | 12            |                  | Illinois                          | 14 1               |                    | X                   | 0.33                 |                   |
| Chree, C.         |           |               |                  |                                   | 94 1               |                    |                     |                      |                   |
| Clements, G. R.   | Harvard   | 13            |                  | Wisconsin                         | 13, 14 2           |                    |                     | 1.00                 |                   |
| Cole, F. N.       | Harvard   | 82            | X                | Columbia                          | 7                  |                    | X                   | 0.29                 |                   |
| Conner, J. R.     |           |               |                  |                                   | 6                  |                    |                     |                      |                   |
| Converse, H. A.   | Hopkins   | 03            |                  | Baltimore Polytech                | 03 1               |                    |                     | 0.08                 |                   |

## APPENDIX VIII

(Continued)

| Name               | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                  | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|--------------------|-----------|---------------|------------------|--|--------------------|--------------------|---------------------|----------------------|-------------------|
| Connell, G. M.     | Princeton | 08            |                  | Yale; New York State Teachers<br>College | 10 1               |                    |                     | 0.14                 |                   |
| * Copeland, A. P.  | Penn      | 13            |                  | Wellesley                                | 15 1               |                    |                     | 0.50                 |                   |
| Cordeiro, F. J. P. |           |               |                  |  | 06 1               |                    |                     |                      |                   |
| Corey, S. A.       | No        |               |                  | Hiteman, Iowa                            | 99, 03 2           |                    |                     | 0.08                 |                   |
| Craig, C. F.       | Cornell   | 08            |                  | Cornell                                  | 10, 14 2           |                    |                     | 0.28                 |                   |
| Craig, T.          | Hopkins   | 78            |                  | Hopkins                                  | 4                  |                    | X                   | 0.17                 |                   |
| * Cummings, L. D.  | Bryn Mawr | 14            |                  | Vassar                                   | 14 1               |                    |                     | 1.00                 |                   |
| Curtis, G.         |           |               |                  | WDC                                      | 93 1               |                    |                     |                      |                   |
| Curtiss, D. R.     | Harvard   | 03            | X                | Northwestern                             | 5                  |                    |                     | 0.42                 | X                 |
| Davis, E. W.       | Hopkins   | 84            |                  | Nebraska                                 | 15 1               |                    | X                   | 0.04                 |                   |
| Decker, F. F.      | Syracuse  | 10            |                  | Syracuse                                 | 15 1               |                    |                     | 0.20                 |                   |
| Dederick, L. S.    | Harvard   | 09            |                  | Princeton                                | 13, 14 2           |                    |                     | 0.33                 |                   |
| Denton, W. W.      | Illinois  | 12            |                  | Illinois                                 | 09, 13 2           |                    |                     | 0.66                 |                   |
| Dines, L. L.       | Chicago   | 11            |                  | Arizona; Saskatchewan                    | 3                  |                    |                     | 0.75                 | X                 |
| Dodd, E. L.        | Yale      | 04            |                  | Texas                                    | 13 1               |                    |                     | 0.09                 |                   |
| Dowling, L. W.     | Clark     | 95            |                  | Wisconsin                                | 04 1               |                    |                     | 0.05                 |                   |
| Dresden, A.        | Chicago   | 09            |                  | Wisconsin                                | 3                  |                    |                     | 0.50                 | X                 |
| Dunkel, O.         | Harvard   | 02            | X                | Missouri; Washington; St. Louis          | 09, 10 2           |                    |                     | 0.153                |                   |
| Durand, W. F.      | Lafayette | 88            |                  | Cornell; Stanford                        | 98 1               | EN                 |                     | 0.04                 |                   |
| Duval, E. P. R.    | No        |               |                  | Oklahoma                                 | 03 1               |                    |                     | 0.06                 |                   |
| Engberg, C. C.     | Nebraska  | 99            |                  | Nebraska                                 | 98, 02 2           |                    |                     | 0.13                 |                   |
| Evans, G. C.       | Harvard   | 10            | X                | Rice                                     | 5                  |                    |                     | 1.00                 | X                 |
| Ferry, F. C.       | Clark     | 98            |                  | Williams                                 | 01, 03 2           |                    |                     | 0.12                 |                   |
| Field, P.          | Cornell   | 02            |                  | Michigan                                 | 4                  |                    |                     | 0.31                 |                   |
| Fields, J. C.      | Hopkins   | 87            | X                | Toronto                                  | 6                  |                    | X                   | 0.25                 |                   |



## APPENDIX VIII

(Continued)

| Name                | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment   | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|---------------------|----------|---------------|------------------|---------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Findlay, W.         | Chicago  | 01            |                  | Columbia; McMaster        | 1                  |                    |                     | 0.07                 |                   |
| Fine, H. B.         | Leipzig  | 85            | X                | Princeton                 | 1                  |                    | X                   | 0.04                 |                   |
| Fischer, C. A.      | Chicago  | 12            |                  | Columbia                  | 3                  |                    |                     | 1.00                 | X                 |
| Fiske, T. S.        | Columbia | 88            |                  | Columbia                  | 91 2               |                    |                     | 0.08                 |                   |
| Ford, W. B.         | Harvard  | 05            |                  | Michigan                  | 5                  |                    |                     | 0.50                 | X                 |
| Fort, T.            | Harvard  | 12            | X                | Michigan                  | 15 1               |                    | X                   | 0.08                 |                   |
| Franklin, F.        | Hopkins  | 80            |                  | Hopkins; Newspapers       | 94,97 2            |                    | X                   | 0.08                 |                   |
| Gaba, M. G.         | Chicago  | 14            |                  | Cornell                   | 15 1               |                    |                     | 1.00                 |                   |
| Gaines, R. H.       | No       |               |                  | Virginia State Laboratory | 99 1               | C                  |                     | 0.04                 |                   |
| Galajikian, H.      |          |               |                  | Princeton                 | 15 1               |                    |                     |                      |                   |
| Gale, A. S.         | Yale     | 01            |                  | Yale; Rochester           | 4                  |                    |                     | 0.28                 |                   |
| * Gates, F. C.      | Penn     | 09            | X                | Goucher; Grinnell         | 93 1               |                    |                     | 0.16                 |                   |
| Gillespie, W.       | Chicago  | 00            |                  | Princeton                 | 00 1               |                    |                     | 0.06                 |                   |
| Gilman, F.          |          |               |                  | Churchville, New York     | 3                  |                    |                     |                      |                   |
| Gleason, R. E.      |          |               |                  | Pasadena                  | 3                  |                    |                     |                      |                   |
| Glenn, O. E.        | Penn     | 05            |                  | Penn                      | 4                  |                    |                     | 0.40                 | X                 |
| Glover, J. W.       | Harvard  | 95            |                  | Michigan                  | 1                  |                    |                     | 0.05                 |                   |
| Gordon, P.          |          |               |                  |                           | 02 2               |                    |                     |                      |                   |
| Gorton, W. C. L.    |          |               |                  | Hopkins                   | 91 2               |                    | X                   |                      |                   |
| Granville, W. A.    | Yale     | 97            |                  | Yale                      | 01 1               |                    |                     | 0.06                 |                   |
| Graustein, W. C.    | Harvard  | 13            | X                | Harvard; Rice             | 15 1               |                    |                     | 0.50                 |                   |
| Green, G. M.        |          |               |                  | Cambridge, Massachusetts  | 14, 15 2           |                    |                     |                      |                   |
| Griffin, F. L.      | Chicago  | 06            |                  | Williams; Reed            | 08,09 2            |                    |                     | 0.22                 |                   |
| Gundelfinger, G. F. |          |               |                  | Sheffield School          | 11 1               |                    |                     |                      |                   |
| Hall, T. P.         | Clark    | 93            |                  | Editor                    | 93 1               |                    |                     | 0.05                 |                   |
| Hamilton, A.        |          |               |                  | Manila, Philippines       | 99,00 2            |                    |                     |                      |                   |

## APPENDIX VIII

(Continued)

| Name               | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment           | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|--------------------|------------|---------------|------------------|-----------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Hancock, H.        | Berlin     | 94            | X                | Chicago;                          | 5                  |                    |                     | 0.24                 |                   |
| Hardy, J. G.       | Hopkins    | 98            |                  | Williams                          | 98,02 2            |                    |                     | 0.12                 |                   |
| Harris, R. A.      | Cornell    | 88            |                  | USCGS                             | 5                  |                    | X                   | 0.21                 |                   |
| Hartwell, G. W.    | Columbia   | 09            |                  | Hamline                           | 09 1               |                    |                     | 0.16                 |                   |
| Haskell, M. W.     | Goettingen | 89            | X                | Berkeley                          | 06 1               |                    |                     | 0.04                 |                   |
| Hathaway, A. S.    | No         |               |                  | Rose                              | 02 1               |                    | X                   | 0.04                 |                   |
| Hawkes, H. E.      | Yale       | 00            | X                | Yale; Columbia                    | 4                  |                    |                     | 0.27                 |                   |
| * Hazlett, O. C.   | Chicago    | 15            |                  | Bryn Mawr; Mt. Holyoke            | 15 1               |                    |                     | 1.00                 |                   |
| Heal, Wm. E.       |            |               |                  | Marion, Indiana                   | 91 1               |                    | X                   |                      |                   |
| Hebbert, C. M.     |            |               |                  |                                   | 15 2               |                    |                     |                      |                   |
| Hewes, L. I.       | Yale       | 01            |                  | Yale; U.S. Bureau of Public Roads | 10 1               | EN                 |                     | 0.07                 |                   |
| Hildebrandt, T. H. | Chicago    | 10            |                  | Michigan                          | 12, 13 2           |                    |                     | 0.40                 |                   |
| Hill, G. W.        | No         |               |                  | Columbia                          | 7                  |                    |                     | 0.29                 |                   |
| Hill, J. E.        | No         |               |                  | Brown                             | 97 1               | EN                 |                     | 0.04                 |                   |
| Hiltbeitel, A. M.  |            |               |                  | Princeton                         | 11 1               |                    |                     |                      |                   |
| Hilton, H.         |            |               |                  |                                   | 14 1               |                    |                     |                      |                   |
| Hodgson, J. E.     |            |               |                  |                                   | 12 1               |                    |                     |                      |                   |
| Holgate, T. F.     | Clark      | 93            |                  | Northwestern                      | 3                  |                    |                     | 0.14                 |                   |
| Hook, E. A.        | No         |               |                  | Columbia                          | 02 1               |                    |                     | 0.11                 |                   |
| Hoskins, L. M.     | No         |               |                  | Stanford                          | 10 2               |                    |                     | 0.08                 |                   |
| Howland, L. A.     | Munich     | 08            | X                | Wesleyan                          | 12, 14 2           |                    |                     | 0.28                 |                   |
| Hudson, H. P.      |            |               |                  | Bryn Mawr                         | 12, 13 2           |                    |                     |                      |                   |
| Hun, J. G.         |            |               |                  |                                   | 04 1               |                    |                     |                      |                   |
| Hulburt, L. S.     | Hopkins    | 94            | X                | Hopkins                           | 92 1               |                    |                     | 0.05                 |                   |
| Hurwitz, W. A.     | Goettingen | 10            | X                | Missouri; Cornell                 | 4                  |                    |                     | 0.80                 | X                 |
| Hussey, W. J.      | No         |               |                  | Stanford; Lick; Michigan          | 91 1               | A                  |                     | 0.04                 |                   |

## APPENDIX VIII

(Continued)

| <u>Name</u>     | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1878-1890</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> |
|-----------------|--------------|-----------------------------|--------------------------------|---------------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|---------------------------------|
| Ingold, L.      |              |                             |                                |                                       | 3                                |                                  |                                   |                                    |                                 |
| Irwin, F.       | Harvard      | 08                          |                                | Princeton; Berkeley                   | 15                               | 1                                |                                   | 0.14                               |                                 |
| Jackson, D.     | Goettingen   | 11                          | X                              | Harvard                               | 6                                |                                  |                                   | 1.50                               | X                               |
| Jackson, F. H.  |              |                             |                                |                                       | 5                                |                                  |                                   |                                    |                                 |
| Jackson, W. H.  | No           |                             | X                              | Haverford                             | 12                               | 1                                |                                   | 0.13                               |                                 |
| Jahnke, E.      |              |                             |                                |                                       | 00                               | 1                                |                                   |                                    |                                 |
| James, G. O.    | Hopkins      | 99                          |                                | Lehigh; Washington (St. Louis)        | 03                               | 1                                |                                   | 0.05                               |                                 |
| Johnson, R. A.  | Harvard      | 13                          |                                | Western Reserve                       | 14                               | 1                                |                                   | 0.50                               |                                 |
| Johnson, W. W.  | No           |                             |                                | Annapolis                             | 92                               | 2                                | X                                 | 0.08                               |                                 |
| Jordan, H. E.   | Chicago      | 04                          |                                | Michigan College of Mines; Kansas     | 07                               | 1                                |                                   | 0.09                               |                                 |
| Kellogg, O. D.  | Goettingen   | 02                          | X                              | Princeton; Missouri                   | 4                                |                                  |                                   | 0.31                               |                                 |
| Kennelly, A. E. | No           |                             | X                              | Harvard                               | 3                                |                                  | EN                                | 0.21                               |                                 |
| Keyser, C. J.   | Columbia     | 02                          |                                | Columbia                              | 03, 05                           | 2                                |                                   | 0.15                               |                                 |
| Kircher, E.     | Illinois     | 14                          |                                | MIT; Harvard                          | 15                               | 1                                |                                   | 1.00                               |                                 |
| Kratwohl, W. C. | Chicago      | 13                          |                                | Armour                                | 14                               | 1                                |                                   | 0.50                               |                                 |
| Kuhn, H. W.     | Cornell      | 01                          |                                | OSU                                   | 04                               | 1                                |                                   | 0.07                               |                                 |
| Kummell, C. H.  |              |                             |                                | OSU                                   | 3                                |                                  | X                                 |                                    |                                 |
| Lambert, P. A.  | No           |                             | X                              | Lehigh                                | 10, 12                           | 2                                |                                   | 0.08                               |                                 |
| Lamond, J. K.   | Yale         | 10                          |                                | Wesleyan                              | 3                                |                                  |                                   | 0.60                               | X                               |
| Landry, A. E.   | Hopkins      | 07                          |                                | Catholic University                   | 09                               | 1                                |                                   | 0.13                               |                                 |
| Lasker, E.      |              |                             |                                |                                       | 04, 08                           | 2                                |                                   |                                    |                                 |
| Lefschetz, S.   | Clark        | 11                          |                                | Nebraska; Kansas                      | 5                                |                                  |                                   | 1.25                               | X                               |
| Leib, D. D.     | Hopkins      | 09                          |                                | Yale; Connecticut College for Women   | 09                               | 1                                |                                   | 0.16                               |                                 |
| Lennes, N. J.   | Chicago      | 07                          |                                | Montana; MIT; Columbia                | 7                                |                                  |                                   | 0.88                               | X                               |
| Leonard, H. B.  | Colorado     | 06                          |                                | Arizona; Oregon                       | 3                                |                                  |                                   | 0.33                               |                                 |
| Lewis, F. P.    |              |                             |                                |                                       | 14                               | 1                                |                                   |                                    |                                 |

## APPENDIX VIII

(Continued)

| <u>Name</u>         | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> # | <u>Principal</u><br><u>Field</u> | <u>Listed</u><br><u>1870-1893</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> |
|---------------------|--------------|-----------------------------|--------------------------------|---------------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|---------------------------------|
| Ling, G. H.         | Columbia     | 96                          |                                | Saskatchewan; Wesleyan; Columbia      | 3                                |                                  |                                   | 0.16                               |                                 |
| Lipka, J.           | Columbia     | 12                          |                                | MIT                                   | 12, 14                           | 2                                |                                   | 0.66                               |                                 |
| Little, C. N.       | Yale         | 85                          |                                | Nebraska; Stanford; Idaho             | 93                               | 1                                | X                                 | 0.04                               |                                 |
| Littlehales, C. W.  | No           |                             |                                | U.S. Hydrographic Office              | 94                               | 1                                | EN                                | 0.08                               |                                 |
| Longley, W. R.      | Chicago      | 06                          |                                | Yale                                  | 14                               | 1                                |                                   | 0.11                               |                                 |
| Loud, F. H.         | No           |                             |                                | Colorado                              | 4                                |                                  |                                   | 0.17                               |                                 |
| Love, C. E.         | Michigan     | 13                          |                                | Michigan                              | 3                                |                                  |                                   | 1.50                               | X                               |
| Lovitt, W. V.       |              |                             |                                | Lafayette, Indiana                    | 15                               | 1                                |                                   |                                    |                                 |
| Lunn, A. C.         | Chicago      | 04                          |                                | Chicago                               | 10, 09                           | 2                                | P                                 | 0.18                               |                                 |
| Lytle, E. B.        | Yale         | 08                          |                                | Illinois                              | 10                               | 1                                |                                   | 0.14                               |                                 |
| McDonald, J. H.     |              |                             |                                |                                       | 01, 06                           | 2                                |                                   |                                    |                                 |
| McDonnell, J.       |              |                             |                                |                                       | 13                               | 1                                |                                   |                                    |                                 |
| McKelvey, J. V.     | Cornell      | 09                          |                                | Cornell                               | 12                               | 1                                |                                   | 0.16                               |                                 |
| McKinney, T. E.     | Chicago      | 05                          |                                | South Dakota                          | 07                               | 1                                |                                   | 0.10                               |                                 |
| McKinnon, A.        |              |                             |                                |                                       | 94, 98                           | 2                                |                                   |                                    |                                 |
| McMahon, J.         | No           |                             | X                              | Cornell                               | 92, 94                           | 2                                | X                                 | 0.08                               |                                 |
| MacGregor, H. H.    |              |                             |                                | Kansas                                | 13                               | 1                                |                                   |                                    |                                 |
| MacMillan, W. D.    | Chicago      | 08                          |                                | Chicago                               | 5                                |                                  |                                   | 0.71                               | X                               |
| MacNeish, H. F.     | Chicago      | 09                          |                                | Yale                                  | 06                               | 2                                |                                   | 0.33                               |                                 |
| Macaulay, F. S.     |              |                             |                                |                                       | 04                               | 1                                |                                   |                                    |                                 |
| MacLagan-Wedderburn |              |                             |                                |                                       | 05                               | 1                                |                                   |                                    |                                 |
| Manning, H. P.      | Hopkins      | 91                          |                                | Brown                                 | 3                                |                                  |                                   | 0.13                               |                                 |
| Marshall, Wm.       | Zurich       | 08                          | X                              | Purdue                                | 09, 10                           | 2                                |                                   | 0.28                               |                                 |
| * Martin, E. N.     | Bryn Mawr    | 01                          | X                              | Mt. Holyoke                           | 01                               | 1                                |                                   | 0.07                               |                                 |
| Mason, M.           | Goettingen   | 03                          | X                              | Yale; Wisconsin                       | 7                                |                                  |                                   | 0.58                               | X                               |
| Mason, T. E.        | Indiana      | 14                          |                                | Purdue                                | 14, 15                           | 2                                |                                   | 2.00                               |                                 |

## APPENDIX VIII

(Continued)

| Name            | Place         | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment        | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|-----------------|---------------|---------------|------------------|--------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Merrill, H. A.  | Yale          | 03            | X                | Wellesley                      | 03 1               |                    |                     | 0.08                 |                   |
| Merriman, M.    | Yale          | 76            |                  | Lohigh                         | 92 1               |                    |                     | 0.04                 |                   |
| Messick, J. F.  | Hopkins       | 06            |                  | Williams; Randolph Macon       | 08 1               |                    |                     | 0.11                 |                   |
| Miles, E. J.    | Chicago       | 10            |                  | Yale                           | 12, 13 2           |                    |                     | 0.40                 |                   |
| Miller, J. A.   | Chicago       | 99            |                  | Indiana; Swarthmore            | 05 1               | A                  |                     | 0.06                 |                   |
| Mitchell, H. H. | Princeton     | 10            |                  | Yale; Penn                     | 4                  |                    |                     | 0.80                 | X                 |
| Moore, C. L. E. | Cornell       | 04            |                  | MIT                            | 5                  |                    |                     | 0.46                 | X                 |
| Moore, C. N.    | Harvard       | 08            |                  | Cincinnati                     | 5                  |                    |                     | 0.71                 | X                 |
| Moore, R. L.    | Chicago       | 05            |                  | Princeton; Penn; Northwestern  | 6                  |                    |                     | 0.60                 | X                 |
| Morehead, J. C. | Yale          | 05            |                  | Northwestern; Carnegie         | 09 1               |                    |                     | 0.10                 |                   |
| Moreno, H. C.   | Clark         | 00            |                  | Stanford                       | 03 1               |                    |                     | 0.06                 |                   |
| Morgan, F. M.   | Cornell       | 12            |                  | Dartmouth                      | 3                  |                    |                     | 1.00                 | X                 |
| Moritz, R. E.   | Nebraska      | 01            | X                | Nebraska; Washington (Seattle) | 4                  |                    |                     | 0.28                 |                   |
| Morley, R. K.   | Clark         | 10            |                  | Worcester                      | 12 1               |                    |                     | 0.20                 |                   |
| Morris, R.      | Cornell       | 07            |                  | Rutgers                        | 1                  |                    |                     | 0.13                 |                   |
| Morrison, B. G. |               |               |                  |                                | 01 1               |                    |                     |                      |                   |
| Moulton, E. J.  | Chicago       | 13            |                  | Northwestern                   | 12 1               |                    |                     | 0.50                 |                   |
| Neikirk, L. I.  | Penn          | 03            |                  | Illinois; Washington (Seattle) | 3                  |                    |                     | 0.25                 |                   |
| Newson, H. B.   | Ohio Wesleyan | 91            | X                | Kansas                         | 6                  |                    | X                   | 0.25                 |                   |
| Noble, C. A.    | Goettingen    | 01            | X                | Berkeley                       | 11 1               |                    |                     | 0.07                 |                   |
| Owens, F. W.    | Chicago       | 07            |                  | Cornell                        | 10 1               |                    |                     | 0.13                 |                   |
| Owens, H. B.    |               |               |                  |                                | 13 1               |                    |                     |                      |                   |
| Page, J. M.     | Leipzig       | 87            | X                | UVA                            | 5                  |                    | X                   | 0.21                 |                   |
| Peirce, A. B.   |               |               |                  | Ann Arbor                      | 04 1               |                    |                     |                      |                   |
| Peirce, B. O.   | Leipzig       | 79            | X                | Harvard                        | 96, 03 2           |                    |                     | 0.08                 |                   |
| Peirce, J. M.   | No            |               |                  | Harvard                        | 04 1               |                    |                     | 0.07                 |                   |

## APPENDIX VIII

(Continued)

| Name                 | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                                 | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|----------------------|------------|---------------|------------------|---|--------------------|--------------------|---------------------|----------------------|-------------------|
| * Pell, A. J.        | Chicago    | 10            | X                | Mt. Holyoke   | 6                  |                    |                     | 1.20                 | X                 |
| Pfeiffer, G. A.      | Columbia   | 14            |                  | Harvard   | 15 1               |                    |                     | 1.00                 |                   |
| Phillips, H. B.      | Hopkins    | 05            |                  | MIT   | 14 1               |                    |                     | 0.10                 |                   |
| Pierpont, J.         | Vienna     | 94            | X                | Yale  | 7                  |                    |                     | 0.33                 |                   |
| Pitcher, A. D.       | Chicago    | 10            |                  | Dartmouth   | 14 1               |                    |                     | 0.20                 |                   |
| Pupin, M. I.         | Berlin     | 89            | X                | Columbia  | 00 1               | EN                 |                     | 0.04                 |                   |
| Putnam, T. M.        | Chicago    | 01            |                  | Berkeley  | 01, 02 2           |                    |                     | 0.14                 |                   |
| Ransom, E. H.        |            |               |                  |   | 01 1               |                    |                     |                      |                   |
| Ranum, A.            | Chicago    | 06            |                  | Cornell   | 7                  |                    |                     | 0.78                 | X                 |
| Rasor, S. E.         | No         |               | X                | OSU   | 10 1               |                    |                     | 0.07                 |                   |
| Reaves, S. W.        | Chicago    | 15            |                  | Oklahoma  | 14 1               |                    |                     | 1.00                 |                   |
| Reddick, H. W.       | Columbia   | 10            |                  | Columbia; Cooper Union                                  | 13 1               |                    |                     | 0.20                 |                   |
| Reed, F. W.          | Virginia   | 07            |                  | Illinois  | 09 1               |                    |                     | 0.13                 |                   |
| Reid, L. W.          | Goettingen | 99            | X                | Haverford   | 01 1               |                    |                     | 0.06                 |                   |
| Rettger, E. W.       | Clark      | 98            |                  | Cornell   | 00 1               |                    |                     | 0.06                 |                   |
| Rice, L. W.          |            |               |                  | Syracuse University                                     | 13 1               |                    |                     |                      |                   |
| Richardson, R. G. D. | Yale       | 06            | X                | Brown   | 3                  |                    |                     | 0.33                 |                   |
| Rietz, H. L.         | Cornell    | 02            |                  | Illinois  | 3                  |                    |                     | 0.23                 |                   |
| Risley, W. J.        | No         |               |                  | Illinois; Millikin                                      | 11 1               |                    |                     | 0.08                 |                   |
| Robbins, R. B.       | Harvard    | 14            |                  | Yale  | 15 1               |                    |                     | 1.00                 |                   |
| Roberts, E. H.       |            |               |                  |   | 95 1               |                    |                     |                      |                   |
| Roberts, R. D.       |            |               |                  | Middletown, New York                                    | 01 1               |                    |                     |                      |                   |
| Roe, E. D. Jr.       | Erlangen   | 98            | X                | Syracuse  | 5                  |                    |                     | 0.29                 |                   |
| Roever, W. H.        | Harvard    | 06            |                  | Washington (St. Louis)                                  | 4                  |                    |                     | 0.44                 | X                 |
| Root, R. E.          | Chicago    | 11            |                  | Annapolis   | 14 2               |                    |                     | 0.50                 |                   |
| Ross, F. E.          | Berkeley   | 01            |                  | International Latitude Observatory;<br>Nautical Almanac | 03 1               |                    |                     | 0.07                 |                   |

## APPENDIX VIII

(Continued)

| Name                  | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment          | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|-----------------------|----------|---------------|------------------|----------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Rowe, J. E.           | Hopkins  | 10            |                  | Haverford; Dartmouth; Penn State | 4                  |                    |                     | 0.80                 | X                 |
| Royce, J.             | Hopkins  | 78            | X                | Harvard                          | 05 1               | PH                 |                     | 0.04                 |                   |
| Rutledge, G.          |          |               |                  | Illinois                         | 10 1               |                    |                     |                      |                   |
| Safford, F. H.        | Harvard  | 97            |                  | Penn                             | 4                  |                    |                     | 0.22                 |                   |
| Sanderson, M.         |          |               |                  |                                  | 12, 13 2           |                    |                     |                      |                   |
| Sayre, H. A.          | Hopkins  | 96            |                  | Alabama                          | 4                  | P                  |                     | 0.21                 |                   |
| Schapper, H.          |          |               |                  |                                  | 10 1               |                    |                     |                      |                   |
| * Schottenfels, I. M. | No       |               |                  | New York Normal College          | 99 1               |                    |                     | 0.06                 |                   |
| Schweitzer, A. R.     |          |               |                  |                                  | 3                  |                    |                     |                      |                   |
| * Scott, C. A.        | London   | 85            | X                | Bryn Mawr                        | 5                  |                    |                     | 0.21                 |                   |
| Sharpe, F. R.         | Cornell  | 07            |                  | Cornell                          | 7                  |                    |                     | 0.88                 | X                 |
| Sheffer, H. M.        |          |               |                  |                                  | 13 1               |                    |                     |                      |                   |
| Sheldon, E. W.        |          |               |                  |                                  | 12 1               |                    |                     |                      |                   |
| Shenton, W. F.        | Hopkins  | 14            |                  | Hopkins; Annapolis               | 15 1               |                    |                     | 1.00                 |                   |
| Siceloff, L. P.       | Columbia | 12            |                  | Columbia                         | 12 1               |                    |                     | 0.33                 |                   |
| * Sinclair, M. E.     | Chicago  | 08            |                  | Oberlin                          | 3                  |                    |                     | 0.42                 | X                 |
| Sisam, C. H.          | Cornell  | 06            |                  | Illinois                         | 6                  |                    |                     | 0.66                 | X                 |
| Skinner, E. B.        | Chicago  | 00            |                  | Wisconsin                        | 03 1               |                    |                     | 0.06                 |                   |
| Slaught, H. E.        | Chicago  | 98            |                  | Chicago                          | 00, 01 2           |                    |                     | 0.12                 |                   |
| Slepian, J.           |          |               |                  | Cornell                          | 15 1               |                    |                     |                      |                   |
| Slichter, C. S.       | No       |               |                  | Wisconsin                        | 11 1               |                    |                     | 0.04                 |                   |
| Slocum, S. E.         | Clark    | 00            |                  | Cincinnati                       | 05 1               |                    |                     | 0.06                 |                   |
| Smith, A. W.          | Chicago  | 04            |                  | Colgate                          | 06 1               |                    |                     | 0.09                 |                   |
| * Smith, C. E.        | Yale     | 04            |                  | Wellesley                        | 07 1               |                    |                     | 0.09                 |                   |
| Smith, P. F.          | Yale     | 91            | X                | Yale                             | 7                  |                    |                     | 0.29                 |                   |
| Starkweather, G. P.   |          |               |                  | Yale                             | 99, 01 2           |                    |                     |                      |                   |

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## APPENDIX VIII

(Continued)

| Name                    | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment            | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|-------------------------|------------|---------------|------------------|------------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Stecker, H. F.          | Wisconsin  | 97            | X                | Penn State                         | 4                  |                    |                     |                      |                   |
| Steimley, L. L.         |            |               |                  |                                    | 15 1               |                    |                     |                      |                   |
| Steinmetz, C. P.        | No         |               | X                | Yonkers, New York                  | 92 2               |                    |                     | 0.09                 |                   |
| Stephens, R. P.         | Hopkins    | 05            |                  | Georgia                            | 3                  |                    |                     | 0.30                 |                   |
| Stone, O.               | No         |               |                  | Various Observatories; UVA         | 3                  | A                  | X                   | 0.12                 |                   |
| Story, W. E.            | Leipzig    | 75            | X                | Clark                              | 07 1               |                    | X                   | 0.04                 |                   |
| Stringham, W. I.        | Hopkins    | 80            |                  | Berkeley; Hopkins                  | 3                  |                    | X                   | 0.12                 |                   |
| Stromquist, C. E.       | Yale       | 03            |                  | Princeton; Wyoming                 | 06, 08 2           |                    |                     | 0.16                 |                   |
| Strong, W. M.           | Yale       | 98            |                  | Yale; Life Insurance               | 93, 00 2           |                    |                     | 0.12                 |                   |
| Swift, E.               | Goettingen | 07            | X                | Princeton; Vermont                 | 13 1               |                    |                     | 0.13                 |                   |
| Taber, H.               | Hopkins    | 88            |                  | Clark                              | 3                  |                    | X                   | 0.12                 |                   |
| Talieferro, T. H.       |            |               |                  | Hopkins                            | 95 1               |                    |                     |                      |                   |
| * Tappan, A. H.         | Cornell    | 14            |                  | West College for Women; Iowa State | 15 1               |                    |                     | 1.00                 |                   |
| Taylor, E. H.           | Harvard    | 09            |                  | East Illinois State Normal         | 13 1               |                    |                     | 0.16                 |                   |
| Thompson, H. D.         | Princeton  | 89            |                  | Princeton                          | 3                  |                    |                     | 0.12                 |                   |
|                         | Goettingen | 92            | X                |                                    |                    |                    |                     |                      |                   |
| Thomsen, H. I.          | Hopkins    | 09            |                  | Hopkins                            | 10 1               |                    |                     | 0.16                 |                   |
| Tracey, J. I.           | Hopkins    | 12            |                  | Yale                               | 14 1               |                    |                     | 0.33                 |                   |
| Underhill, A. L.        | Chicago    | 06            |                  | Minnesota                          | 08, 14 2           |                    |                     | 0.22                 |                   |
| Unser, S. E.            |            |               |                  |                                    | 12 1               |                    |                     |                      |                   |
| * Van Benschoten, A. L. | Cornell    | 08            | X                | Wells College                      | 09 1               |                    |                     | 0.14                 |                   |
| Van Groos, J. A.        |            |               |                  |                                    | 02 1               |                    |                     |                      |                   |
| Vandervries, J. N.      | Clark      | 01            |                  | Kansas                             | 10 1               |                    |                     | 0.07                 |                   |
| Vandiver, H. S.         | No         |               |                  |                                    | 12, 14 2           |                    |                     | 0.40                 |                   |
| Wahlin, G. E.           | Yale       | 06            |                  | Illinois                           | 10, 15 2           |                    |                     | 0.22                 |                   |
| Westfall, W. D. A.      | Goettingen | 05            | X                | Missouri                           | 09 1               |                    |                     | 0.10                 |                   |

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## APPENDIX VIII

(Continued)

| Name              | Place     | <u>Ph.D.</u><br>Year | Foreign<br>Study | Principal<br>Employment            | Articles<br>Year # | Principal<br>Field | Listed<br>1878-1890 | Productivity<br>Rate | High<br>Producers |
|-------------------|-----------|----------------------|------------------|------------------------------------|--------------------|--------------------|---------------------|----------------------|-------------------|
| Westlund, J.      | Yale      | 98                   | X                | Purdue                             | 4                  |                    |                     | 0.24                 |                   |
| * White, M. B.    |           |                      |                  |                                    | 07, 12             | 2                  |                     |                      |                   |
| Whittemore, J. K. | No        |                      |                  | Western Reserve; Harvard; Yale     | 7                  |                    |                     | 0.58                 | X                 |
| Whitford, E. E.   | Columbia  | 12                   |                  | CCNY                               | 14                 | 1                  |                     | 0.33                 |                   |
| Wiley, F. B.      | Chicago   | 14                   |                  | Denison                            | 14                 | 1                  |                     | 1.00                 |                   |
| Williams, F. B.   | Clark     | 00                   |                  | Clark                              | 12                 | 1                  |                     | 0.07                 |                   |
| Williams, K. P.   | Princeton | 13                   |                  | Indiana                            | 13, 14             | 2                  |                     | 1.00                 |                   |
| Wilson, A. H.     | Chicago   | 11                   | X                | Haverford                          | 11, 14             | 2                  |                     | 0.50                 |                   |
| Wilson, N. R.     | Chicago   | 08                   |                  | Manitoba                           | 04                 | 1                  |                     | 0.14                 |                   |
| Winger, R. M.     | Hopkins   | 12                   |                  | Oregon; Washington (Seattle)       | 14                 | 1                  |                     | 0.33                 |                   |
| Wolff             |           |                      |                  |                                    | 08                 | 1                  |                     |                      |                   |
| Wood, F. S.       |           |                      |                  | MIT                                | 01, 03             | 2                  |                     |                      |                   |
| * Wood, R. G.     | Yale      | 01                   | X                | Smith                              | 00                 | 1                  |                     | 0.07                 |                   |
| Wright, J. E.     |           |                      |                  | Bryn Mawr                          | 7                  |                    |                     |                      |                   |
| Young, A. E.      | Princeton | 03                   |                  | Miami                              | 4                  |                    |                     | 0.25                 |                   |
| Young, J. W.      | Cornell   | 04                   |                  | Illinois; Northwestern; Princeton; | 7                  |                    |                     | 0.64                 | X                 |
|                   |           |                      |                  | Dartmouth                          |                    |                    |                     |                      |                   |
| Young, J. W. A.   | Clark     | 92                   | X                | Clark                              | 93                 | 1                  |                     | 0.04                 |                   |
| Young, W. H.      |           |                      |                  |                                    | 11                 | 1                  |                     |                      |                   |

## APPENDIX IX

## PRODUCTIVE CHEMISTS

Four or More Articles

1879 - 1891

| Name              | Place      | <u>Ph.D.</u><br>Year | Foreign<br>Study | Principal<br>Employment                               | Total<br>Articles | Principal<br>Field | Listed<br>1892-1914 | Productivity<br>Rate | P  | A  | M  |
|-------------------|------------|----------------------|------------------|---|-------------------|--------------------|---------------------|----------------------|----|----|----|
| Anschutz, R.      |            |                      |                  |   | 6                 |                    |                     |                      | 6  |    |    |
| Atwater, W. O.    | Yale       | 69                   | X                | Wesleyan; Storrs Agricultural<br>Experimental Station | 11                |                    |                     | -0.92                |    | 8  | 3  |
| Austen, Peter T.  | Zurich     | 76                   | X                | Rutgers   | 11                |                    |                     | 0.92                 | 11 |    |    |
| Bachman, I. A.    |            |                      |                  |   | 4                 |                    |                     | 0.33                 | 4  |    |    |
| Booth, James C.   | No         |                      |                  | U.S. Mint (Philadelphia)                              | 4                 |                    |                     | 0.44                 |    | 4  |    |
| Bourgougnon, A.   |            |                      |                  | CCNY  | 6                 |                    |                     | 0.50                 | 2  | 4  |    |
| Breneman, A. A.   | No         |                      |                  | Cornell   | 10                |                    |                     | 0.83                 | 2  | 2  | 6  |
| Casamajor, P.     |            |                      | X                |   | 13                |                    |                     | 1.08                 | 2  | 11 |    |
| Chittenden, R. H. | Yale       | 80                   | X                | Yale  | 14                |                    |                     | 1.27                 |    |    | 14 |
| Clarke, F. W.     | No         |                      |                  | Cincinnati; USGS                                      | 18                |                    |                     | 1.50                 | 18 |    |    |
| Classen, Edo      |            |                      |                  |   | 4                 |                    |                     | 0.33                 |    | 4  |    |
| Comey, A. M.      | Heidleberg | 85                   | X                | Harvard; Tufts  | 5                 |                    |                     | 0.83                 | 5  |    |    |
| Comstock, W. J.   | No         |                      | X                | Sheffield Science School                              | 5                 |                    |                     | 2.50                 | 5  |    |    |
| Crafts, J. M.     | No         |                      | X                | MIT   | 4                 |                    |                     | 0.33                 | 4  |    |    |
| Dereamus, C. A.   | Heidelberg | 73                   | X                | Bellevue Hospital Medical College;<br>CCNY            | 6                 |                    |                     | 0.50                 |    | 3  | 3  |
| Drown, T. M.      | M.D.       |                      | X                | Lafayette; MIT  | 4                 |                    |                     | 0.33                 |    | 4  |    |
| Duggan, J. R.     |            |                      |                  | Hopkins   | 4                 |                    |                     | 0.33                 |    |    | 4  |
| Dunnington, F. P. | No         |                      |                  | University of Virginia                                | 4                 |                    |                     | 0.33                 | 3  | 1  |    |
| Endermann, H.     | Marbura    | 66                   | X                | New York City Health Department                       | 7                 |                    |                     | 0.58                 | 3  | 4  |    |
| Freer, P. C.      | Munich     | 87                   | X                | Michigan  | 6                 |                    |                     | 1.50                 | 6  |    |    |

## APPENDIX IX

(Continued)

| Name              | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Total<br>Articles | Principal<br>Field | Listed<br>1892-1914 | Productivity<br>Rate | P  | A  | M  |
|-------------------|------------|---------------|------------------|--|-------------------|--------------------|---------------------|----------------------|----|----|----|
| Friedburg, L. H.  | Goettingen | 70            | X                | CCNY   | 11                |                    |                     | 0.92                 | 6  | 5  |    |
| Geisler, J. F.    | No         |               |                  | New York Mercantile Exchange;<br>New York State Department of<br>Agriculture | 5                 |                    |                     | 1.66                 |    | 3  | 2  |
| Gibbs, Wolcott    | No         |               | X                | Harvard  | 16                |                    |                     | 1.33                 | 15 |    | 1  |
| Gladding, Thos.   | No         |               |                  | Stillwell & Gladding Chemical<br>Laboratory; NYC                             | 9                 |                    |                     | 0.90                 | 1  | 8  |    |
| Goessmann, C. A.  | Goettingen | 52            | X                | Massachusetts Agricultural College   | 5                 |                    |                     | 0.42                 |    | 4  | 1  |
| Gooch, F. A.      | Harvard    | 77            | X                | Yale   | 4                 |                    |                     | 0.33                 | 4  |    |    |
| Greene, Wm. H.    | M.D.       |               |                  | Central High School (Philadelphia)   | 5                 |                    |                     | 0.42                 | 4  | 1  |    |
| Hill, H. B.       | No         |               | X                | Harvard  | 12                |                    |                     | 1.00                 | 12 |    |    |
| Hooker, S. C.     | Munich     | 85            | X                | Industry   | 4                 |                    |                     | 0.66                 | 3  | 1  |    |
| Jackson, C. L.    | No         |               | X                | Harvard  | 29                |                    |                     | 2.42                 | 27 | 2  |    |
| Keiser, E. H.     | Hopkins    | 84            |                  | Washington University  | 12                |                    |                     | 1.71                 | 12 |    |    |
| Kinnicutt, L. P.  | Harvard    | 82            | X                | Worcester  | 6                 |                    |                     | 0.66                 | 6  |    |    |
| Kuhara, M.        | No         |               |                  |  | 6                 |                    |                     | 0.50                 | 6  |    |    |
| Ladd, E. F.       | No         |               |                  | North Dakota Agricultural College  | 5                 |                    |                     | 1.25                 |    | 2  | 3  |
| Leeds, A. R.      | Yes        |               |                  | Stevens Institute  | 54                |                    |                     | 4.50                 | 33 | 8  | 13 |
| McCaleb, J. F.    |            |               |                  |  | 4                 |                    |                     | 0.33                 |    | 4  |    |
| McCay, L. W.      | Princeton  | 83            | X                | Princeton  | 5                 |                    |                     | 0.63                 | 5  |    |    |
| Mabery, C. F.     | Harvard    | 81            |                  | Case   | 30                |                    |                     | 3.00                 | 16 | 11 | 3  |
| Mackintosh, J. B. |            |               |                  |  | 4                 |                    |                     | 0.33                 | 4  |    |    |
| Mallet, J. W.     | Goettingen | 52            | X                | University of Virginia   | 13                |                    |                     | 1.08                 | 9  | 4  |    |
| Maxwell, W.       |            |               |                  |  | 7                 |                    |                     | 0.58                 |    | 6  | 1  |
| Menke, A. E.      |            |               |                  |  | 6                 |                    |                     | 0.50                 | 3  | 3  |    |
| Michael, A.       | No         |               | X                | Tufts  | 43                |                    |                     | 4.30                 | 43 |    |    |

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## APPENDIX IX

(Continued)

| Name             | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                          | Total<br>Articles | Principal<br>Field | Listed<br>1892-1914 | Productivity<br>Rate | P  | A | M |
|------------------|------------|---------------|------------------|--|-------------------|--------------------|---------------------|----------------------|----|---|---|
| Mixter, W. G.    | No         |               | X                | Sheffield Science School                         | 14                |                    |                     | 1.12                 | 6  | 8 |   |
| Morley, E. W.    | No         |               |                  | Western Reserve                                  | 7                 |                    |                     | 0.58                 | 7  |   |   |
| Morse, H. N.     | Goettingen | 75            | X                | Hopkins  | 16                |                    |                     | 1.33                 | 13 | 3 |   |
| Mott, H. A.      | Columbia   | 75            |                  | New York Medical College                         | 4                 |                    |                     | 0.44                 |    | 2 | 2 |
| Nef, J. U.       | Munich     | 86            | X                | Chicago  | 6                 |                    |                     | 1.00                 | 6  |   |   |
| Newbury, S. B.   |            |               |                  |  | 7                 |                    |                     | 0.58                 | 6  | 1 |   |
| Norton, L. M.    |            |               |                  |  | 9                 |                    |                     | 0.75                 | 9  |   |   |
| Norton, T. H.    | Heidelberg | 75            | X                | University of Cincinnati                         | 9                 |                    |                     | 0.75                 | 9  |   |   |
| Noyes, W. A.     | Hopkins    | 82            |                  | Tennessee; Rose; Bureau of Standards             | 39                |                    |                     | 5.57                 | 32 | 7 |   |
|                  | Munich     | 89            | X                |  |                   |                    |                     |                      |    |   |   |
| Orndorff, W. R.  | Hopkins    | 87            | X                | Cornell  | 5                 |                    |                     | 1.25                 | 5  |   |   |
| Osborne, T. B.   | Yale       | 85            |                  | Connecticut Agricultural Experimental<br>Station | 4                 |                    |                     | 0.66                 |    | 4 |   |
| Pitkin, L.       |            |               |                  |  | 8                 |                    |                     | 0.66                 | 5  |   | 3 |
| Remsen, I.       | Goettingen | 70            | X                | Hopkins  | 38                |                    |                     | 3.12                 | 38 |   |   |
| Richardson, C.   | No         |               |                  | USDA   | 9                 |                    |                     | 1.28                 |    | 9 |   |
| Schneider, E. A. |            |               |                  |  | 4                 |                    |                     | 0.33                 | 4  |   |   |
| Smith, E. F.     | Goettingen | 76            | X                | University of Pennsylvania                       | 22                |                    |                     | 1.83                 | 22 |   |   |
| Stebbins, J. H.  | Omaha      | 93            |                  | Industry   | 25                |                    |                     | 25.00                | 17 | 8 |   |
| Venable, F. P.   | Goettingen | 81            | X                | North Carolina                                   | 6                 |                    |                     | 0.60                 | 5  | 1 |   |
| Volney, C. W.    | Berlin     | 63            | X                | Manufacturer                                     | 4                 |                    |                     | 0.33                 | 2  | 2 |   |
| Walter, E.       | Columbia   | 75            |                  | Columbia; New York Health Department             | 9                 |                    |                     | 0.75                 | 2  | 3 | 4 |
| Warder, R. B.    | No         |               | X                | Haverford; Purdue; Harvard                       | 6                 |                    |                     | 0.50                 | 5  |   | 1 |
| Weber, H. A.     | Ohio State | 79            | X                | Illinois; OSU                                    | 4                 |                    |                     | 0.33                 | 1  |   | 3 |
| Wiley, H. W.     | Hanover    | 76            |                  | Purdue; USDA                                     | 11                |                    |                     | 0.92                 | 3  | 8 |   |

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## APPENDIX X

## LESS PRODUCTIVE CHEMISTS

Three or Fewer Articles

1879 - 1891

| Name           | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment           | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|----------------|------------|---------------|------------------|-----------------------------------|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Ador, E.       |            |               |                  |                                   | 79 1               |                     | 0.08                 |                   | 1 |   |   |
| Armsby, H. P.  | Yale       | 79            | X                | Pennsylvania State College        | 80,86 2            |                     | 0.16                 |                   | 2 |   |   |
| Babbitt, H. C. |            |               |                  | Agricultural Experimental Station |                    |                     |                      |                   |   |   |   |
| Baird, J. W.   |            |               |                  |                                   | 87 1               |                     |                      |                   |   | 1 |   |
| Baird, R. A.   |            |               |                  | University of Michigan            | 83 1               |                     |                      |                   | 1 |   |   |
| Baker, R. W.   |            |               |                  |                                   | 89 1               |                     |                      |                   |   | 1 |   |
| Bartley, E. H. | No         |               |                  | University of Virginia            | 85 1               |                     |                      |                   | 1 |   |   |
|                |            |               |                  | Health Department of Brooklyn;    | 90 1               |                     | 0.08                 |                   |   | 1 |   |
|                |            |               |                  | Long Island College Hospital      |                    |                     |                      |                   |   |   |   |
| Barus, C.      | Wurzburg   | 79            | X                | USGS; Brown University            | 90 1               |                     | 0.08                 |                   | 1 |   |   |
| Bayley, W. S.  | Hopkins    | 86            |                  | USGS                              | 83 1               |                     | 0.20                 |                   | 1 |   |   |
| Beamer, M.     |            |               |                  |                                   | 79,80 2            |                     |                      |                   | 2 |   |   |
| Behr, A.       | Heidelberg | 69            | X                | Industry                          | 82 1               |                     | 0.08                 |                   |   | 1 |   |
| Bell, L.       | Hopkins    | 88            |                  | MIT; Independent                  | 85 2               |                     | 0.66                 |                   | 2 |   |   |
| Bentley, W. B. | Harvard    | 98            |                  | Arkansas; Ohio (Athens)           | 90 1               |                     | 1.00                 |                   | 1 |   |   |
| Bernhardt, W.  |            |               |                  |                                   | 91 1               |                     |                      |                   | 1 |   |   |
| Berry, N. A.   |            |               |                  |                                   | 86 1               |                     |                      |                   | 1 |   |   |
| Bert, P.       |            |               |                  |                                   | 79 1               |                     |                      |                   | 1 |   |   |
| Bird, M.       |            |               |                  |                                   | 85,86 3            |                     |                      |                   |   |   | 1 |
| Blair, A. A.   | No         |               |                  | Independent                       | 79,85 2            |                     | 0.16                 |                   | 3 |   |   |
| Borden, J. L.  |            |               |                  |                                   | 84 1               |                     |                      |                   |   | 2 |   |
|                |            |               |                  |                                   |                    |                     |                      |                   | 1 |   |   |

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## APPENDIX X

(Continued)

| Name               | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                            | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|--------------------|------------|---------------|------------------|--|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Brackett, R. W.    |            |               |                  |  | 87 1               |                     |                      |                   | 1 |   |   |
| Brown, P. H.       |            |               |                  |  | 81,83 2            |                     |                      |                   | 2 |   |   |
| Brown, L. P.       |            |               |                  |  | 89 2               |                     |                      |                   |   | 2 |   |
| Brown, W. G.       | No         |               | X                | Tennessee, Washington & Lee;<br>Missouri           | 84 2               |                     | 0.20                 | X                 | 2 |   |   |
| Bruehl, J. W.      |            |               |                  |  | 79 1               |                     |                      |                   | 1 |   |   |
| Brunner, D. B.     |            |               |                  |  | 83 1               |                     |                      |                   | 1 |   |   |
| Burney, W.         |            |               |                  |  | 81 1               |                     |                      |                   | 1 |   |   |
| Burton, B. S.      |            |               |                  |  | 81,82 3            |                     |                      |                   | 3 |   |   |
| Burton, W. M.      |            |               |                  |  | 89,90 3            |                     |                      |                   | 2 |   |   |
| Caldwell, G. C.    | Goettingen | 57            | X                | Cornell  | 85 1               |                     | 0.08                 |                   |   | 1 |   |
| Carson, A. I.      |            |               |                  |  | 88 1               |                     |                      |                   | 1 |   |   |
| Carter, O.C.S.     | No         |               |                  | Central High School (Philadelphia);<br>Independent | 85 1               |                     | 0.08                 |                   |   | 1 |   |
| Chamberlain, J. C. |            |               |                  |  | 83 1               |                     |                      |                   | 1 |   |   |
| Chandler, C. F.    | Goettingen | 56            | X                | Columbia   | 89 1               |                     |                      |                   |   |   | 1 |
| Chatard, T. E.     |            |               |                  |  | 91 2               |                     |                      |                   |   | 2 |   |
| Ciamician, G. L.   |            |               |                  |  | 79 1               |                     |                      |                   | 1 |   |   |
| Clarke, F. W.      | No         |               |                  | USGS   | 4                  |                     |                      |                   | 2 | 2 |   |
| Coale, R. D.       |            |               |                  |  | 81,84 2            |                     |                      |                   | 2 |   |   |
| Colby, C. E.       |            |               |                  |  | 87,91 2            |                     |                      |                   | 2 |   |   |
| Collier, P.        |            |               |                  | USDA   | 80 2               |                     |                      |                   | 1 | 1 |   |
| Cooke, J. P.       | No         |               | X                | Princeton  | 88,89 3            |                     |                      |                   | 3 |   |   |
| Cornwall, H. B.    | No         |               |                  | USDA; Internal Revenue Bureau                      | 80 2               |                     |                      |                   | 2 |   |   |
| Crampton, C. A.    | No         |               |                  | Yale   | 87,89 3            |                     | 0.60                 |                   |   | 3 |   |
| Curran, G. W.      |            |               |                  |  | 84 1               |                     |                      |                   |   |   | 1 |

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## APPENDIX X

(Continued)

| Name             | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|------------------|------------|---------------|------------------|--|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Frear, Wm.       | Wesleyan   | 83            |                  | Pennsylvania State; Pennsylvania<br>State College Experimental Station | 85                 | 1                   | 0.13                 |                   | 1 |   |   |
| Friedel, C.      |            |               |                  |  | 84                 | 1                   |                      |                   | 1 |   |   |
| Furry, F. E.     |            |               |                  | Cornell  | 84                 | 1                   |                      |                   | 1 |   |   |
| Genth, F. A.     | No         |               |                  | Penn; Pennsylvania Department of<br>Agriculture                        | 79                 | 2                   | 0.25                 |                   | 2 |   |   |
| Geyer, Wm. E.    |            |               |                  |  | 80                 | 1                   |                      |                   | 1 |   |   |
| Gibson, H. B.    |            |               |                  |  | 90                 | 1                   |                      |                   | 1 |   |   |
| Green, E. M.     |            |               |                  |  | 86                 | 1                   |                      |                   |   |   | 1 |
| Green, W. D.     |            |               |                  |  | 86                 | 1                   |                      |                   |   |   | 1 |
| Gregg, W. H.     | No         |               |                  | Port of New York   | 81                 | 1                   | 0.08                 |                   |   | 1 |   |
| Grissom, R. G.   |            |               |                  | North Carolina   | 88                 | 2                   |                      |                   | 2 |   |   |
| Griswold, W. L.  |            |               |                  |  | 81                 | 1                   |                      |                   |   |   | 1 |
| Hall, F. P.      |            |               |                  |  | 83                 | 1                   |                      |                   |   | 1 |   |
| Hall, L. B.      | Goettingen | 75            | X                | Haverford  | 80                 | 2                   | 0.16                 |                   | 2 |   |   |
| Hall, Wm. F.     |            |               |                  |  | 91                 | 1                   |                      |                   | 1 |   |   |
| Hallock, A. P.   | Columbia   | 83            |                  | Industry   | 82                 | 1                   | 0.13                 |                   | 1 |   |   |
| Hallock, E. J.   |            |               |                  |  |                    | 3                   |                      |                   | 3 |   |   |
| Hardaway, H.     |            |               |                  |  | 86                 | 1                   |                      |                   |   | 1 |   |
| Harrison, G.     |            |               |                  |  | 86                 | 1                   |                      |                   | 1 |   |   |
| Hart, E.         | Hopkins    | 78            |                  | Lafayette  |                    | 3                   | 0.25                 |                   | 3 |   |   |
| Hartshorn, G. T. |            |               |                  |  | 83                 | 1                   |                      |                   | 1 |   |   |
| Hastings, C. S.  | Yale       | 73            |                  | Yale   | 79                 | 1                   | 0.08                 |                   |   | 1 |   |
| Haynes, I. S.    | No         |               |                  | Harlem Hospital; Cornell Medical<br>College                            | 88                 | 1                   | 0.50                 |                   |   | 1 |   |
| Hazen, A.        | No         |               |                  | Massachusetts State Board of Health;<br>New York City Engineer         | 89                 | 1                   | 1.00                 |                   | 1 |   |   |

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## APPENDIX X

(Continued)

| Name               | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment | Articles<br>Year # | Listed<br>1892-1914 | Productivity<br>Rate | High<br>Producers | P | A | M |
|--------------------|------------|---------------|------------------|-------------------------|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Dabney, C. W.      | Goettingen | 80            | X                | Tennessee               | 83                 | 1                   | 0.09                 |                   | 1 |   |   |
| Dabney, C.W., Jr.  |            |               |                  |                         | 84                 | 1                   |                      |                   |   | 1 |   |
| Darton, N. H.      | No         |               |                  | USGS                    |                    | 3                   | 3.00                 | X                 |   | 3 |   |
| Davis, I. T.       |            |               |                  |                         | 89                 | 1                   |                      |                   | 1 |   |   |
| Day, D. T.         | Hopkins    | 83            |                  | USGS                    | 86                 | 1                   | 0.13                 |                   | 1 |   |   |
| Day, Wm. C.        |            |               |                  |                         | 81, 88             | 2                   |                      |                   | 2 |   |   |
| DeRoode, R.        |            |               |                  |                         | 90                 | 1                   |                      |                   | 1 |   |   |
| DeSchweintz, E. A. |            |               |                  |                         | 84, 91             | 2                   |                      |                   |   | 1 | 1 |
| Dodge, F. D.       |            |               |                  |                         | 89, 90             | 2                   |                      |                   | 2 |   |   |
| Dohme, A.R.L.      | Hopkins    | 89            | X                | Sharp & Dohme           | 91                 | 1                   | 0.50                 |                   | 1 |   |   |
| Donaldson, H. H.   | Hopkins    | 85            |                  | Chicago                 | 80                 | 1                   | 0.16                 |                   |   |   | 1 |
| Drown, T. M.       |            |               |                  |                         | 79                 | 1                   |                      |                   |   | 1 |   |
| Dudley, W. L.      | No         |               |                  | Vanderbilt              | 79, 88             | 2                   | 0.50                 |                   | 2 |   |   |
| Dyer, J. G.        |            |               |                  |                         | 86                 | 1                   |                      |                   | 1 |   |   |
| Eiloart, A.        |            |               |                  |                         | 90                 | 1                   |                      |                   | 1 |   |   |
| Elliott, A. H.     |            |               |                  | College Mines           |                    | 3                   | 0.25                 |                   | 2 | 1 |   |
| Ely, J. S.         |            |               |                  |                         | 82, 83             | 2                   |                      |                   |   |   | 2 |
| Emerson, W. H.     |            |               |                  |                         | 86                 | 1                   |                      |                   | 1 |   |   |
| Emery, W. O.       |            |               |                  |                         | 91                 | 2                   |                      |                   | 2 |   |   |
| Evans, C. S.       |            |               |                  |                         | 83                 | 1                   |                      |                   | 1 |   |   |
| Everhart, E.       |            |               |                  |                         | 80, 81             | 2                   |                      |                   | 1 | 1 |   |
| Eyster, G. S.      |            |               |                  |                         | 83, 85             | 2                   |                      |                   | 2 |   |   |
| Fahlberg, C.       |            |               |                  | Hopkins                 | 79, 80             | 3                   |                      |                   | 3 |   |   |
| Field, A. W.       |            |               |                  | Harvard                 | 80                 | 1                   |                      |                   | 1 |   |   |
| Fleitman, T.       |            |               |                  |                         | 79                 | 1                   |                      |                   |   | 1 |   |
| Foote, H., C.      |            |               |                  |                         | 84                 | 1                   |                      |                   |   | 1 |   |

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## APPENDIX XI

(Continued)

| Name              | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Total<br>Articles | Principal<br>Field | Listed<br>1879-1891 | Productivity<br>Rate | P  | A  | M |
|-------------------|------------|---------------|------------------|--|-------------------|--------------------|---------------------|----------------------|----|----|---|
| Thatcher, R. W.   | No         |               |                  | Washington Agricultural State<br>Experimental Station; Washington<br>State | 8                 |                    |                     | 0.57                 |    | 7  | 1 |
| Tolman, L. M.     | No         |               |                  | USDA   | 13                |                    |                     | 1.18                 |    | 13 |   |
| Torrey, H. A.     |            |               |                  | Harvard  | 12                |                    |                     |                      | 12 |    |   |
| Tower, O. F.      | Leipzig    | 95            | X                | Adelbert   | 10                |                    |                     | 0.53                 | 10 |    |   |
| Turrentine, J. W. | Cornell    | 08            |                  | Wesleyan; USDA   | 14                |                    |                     | 2.33                 | 7  | 7  |   |
| Van Slyke, L. L.  | Michigan   | 82            |                  | New York Experimental Station  | 8                 |                    |                     | 0.57                 |    | 8  |   |
| Veitch, F. P.     | No         |               |                  | Bureau of Soils; USDA  | 10                |                    |                     | 0.56                 |    | 10 |   |
| Venable, F. P.    | Goettingen | 81            | X                | North Carolina   | 14                |                    |                     | 0.61                 | 13 | 1  |   |
| Walker, P. H.     |            |               |                  | USDA   | 9                 |                    |                     |                      | 1  | 8  |   |
| Washburn, E. W.   | MIT        | 08            |                  | Illinois   | 9                 |                    |                     | 1.50                 | 9  |    |   |
| Wheeler, H. L.    |            |               |                  | Yale   | 10                |                    |                     |                      | 10 |    |   |
| Wiley, H. W.      | Hanover    | 76            |                  | USDA; George Washington  | 17                |                    |                     | 0.74                 | 1  | 14 | 2 |
| Winton, A. L.     | No         |               |                  | Connecticut Agricultural Experimental<br>Station; USDA                     | 9                 |                    |                     | 0.39                 |    | 9  |   |
| Woodman, A. G.    | No         |               |                  | MIT  | 10                |                    |                     | 0.77                 |    | 9  | 1 |
| Young, S. W.      | No         |               | X                | Stanford   | 17                |                    |                     | 1.00                 | 17 |    |   |
| Dudley, Wm. L.    | M.D.       |               |                  | Vanderbilt   | 11                |                    |                     | 0.50                 | 6  | 5  |   |

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## APPENDIX XII

## LESS PRODUCTIVE CHEMISTS

Seven or Fewer Articles

1892 - 1914

A RANDOM SAMPLE (1/8) OF THE TOTAL GROUP

| Name            | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-----------------|------------|---------------|------------------|--|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Adams, L. H.    | No         |               |                  | Geophysical Laboratory, Carnegie<br>Institution                        | 3                  |                     | 0.13                 |                   | 3 |   |   |
| Alder, Alfred   |            |               |                  |  | 14                 | 1                   |                      |                   |   | 1 |   |
| Allen, H. C.    |            |               |                  | Kansas   | 14                 | 1                   |                      |                   | 1 |   |   |
| Amend, O. P.    |            |               |                  | New York   | 06                 | 1                   |                      |                   |   |   |   |
| Andrews, G. F.  |            |               |                  |  | 94                 | 1                   |                      |                   |   | 1 |   |
| Arny, H. V.     | Goettingen | 96            | X                | Western Reserve; Columbia  | 14                 | 1                   | 0.06                 |                   |   | 1 |   |
| Atkinson, F. C. | No         |               |                  | American Hominy Company; Indiana                                       | 11                 | 1                   | 0.06                 |                   |   | 1 |   |
| Babcock, E. N.  |            |               |                  | Reading, Massachusetts   | 06                 | 1                   |                      |                   | 1 |   |   |
| Bablmann, C.    |            |               |                  |  | 14                 | 1                   |                      |                   |   | 1 |   |
| Bain, J. W.     | No         |               | X                | Toronto  | 03                 | 1                   | 0.09                 |                   |   | 1 |   |
| Ball, S.        |            |               |                  |  | 03                 | 1                   |                      |                   |   | 1 |   |
| Barnard, H. E.  | No         |               |                  | State Laboratory of Hygiene,<br>Indiana; Indiana State Board of Health | 06, 14             | 2                   | 0.16                 |                   |   | 2 |   |
| Bartlett, E. H. |            |               |                  |  | 10                 | 1                   |                      |                   |   | 1 |   |
| Bassett, L. L.  |            |               |                  |  | 95                 | 1                   |                      |                   | 1 |   |   |
| Beans, H. T.    | Columbia   | 04            |                  | Columbia   | 01-13              | 4                   | 0.40                 | X                 | 2 | 2 |   |
| Belden, A. W.   |            |               |                  |  | 98                 | 1                   |                      |                   | 1 |   |   |

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## APPENDIX XII

(Continued)

| Name              | Place           | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment       | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-------------------|-----------------|---------------|------------------|-------------------------------|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Benedict, S.      | Yale            | 08            |                  | Cornell                       | 03-08 6            |                     | 1.00                 | X                 | 4 | 1 | 1 |
| Bennett, H. H.    | No              |               |                  | North Carolina; USDA          | 02 1               |                     | 0.20                 |                   | 1 |   |   |
| Bergein, O.       | Jefferson       | 14            |                  | Jefferson Medical College     | 13 2               |                     | 2.00                 |                   |   |   | 2 |
| Bigelow, S. L.    | Medical College |               |                  |                               |                    |                     |                      |                   |   |   |   |
| Bisbee, H.        | Leipzig         | 98            | X                | Michigan                      | 07, 09 3           |                     | 0.19                 |                   | 3 |   |   |
| Blair, A. A.      | No              |               |                  | Harvard                       | 04 1               |                     |                      |                   | 1 |   |   |
| Bliss, F. W.      |                 |               |                  | Independent                   | 95-08 6            |                     | 0.26                 |                   | 1 | 5 |   |
| Bolling, R.       |                 |               |                  | Michigan                      | 09 1               |                     |                      |                   | 1 |   |   |
| Bonsib, R. S.     |                 |               |                  |                               | 00, 01 2           |                     |                      |                   |   | 2 |   |
| Bosworth, A. W.   | No              |               |                  | Indiana                       | 11 1               |                     |                      |                   | 1 |   |   |
| Boughton, E. W.   |                 |               |                  | New York Experimental Station | 05-14 4            |                     | 0.57                 | X                 |   | 4 |   |
| Bradley, C. E.    | No              |               |                  |                               | 11, 13 2           |                     |                      |                   |   | 2 |   |
|                   |                 |               |                  | Pacific University; Oregon;   | 06-12 7            |                     | 0.58                 | X                 |   | 7 |   |
|                   |                 |               |                  | Oregon Experimental Station;  |                    |                     |                      |                   |   |   |   |
|                   |                 |               |                  | U. S. Rubber Company          |                    |                     |                      |                   |   |   |   |
| Breazeale, J. F.  | No              |               |                  | USDA                          | 04, 06 2           |                     | 0.16                 |                   |   | 2 |   |
| Briggs, C. H.     |                 |               |                  |                               | 13 1               |                     |                      |                   | 1 |   |   |
| Brokaw, A. D.     | Chicago         | 13            |                  | Chicago                       | 13 1               |                     | 0.33                 |                   |   | 1 |   |
| * Brown, L.       |                 |               |                  |                               | 03 1               |                     |                      |                   | 1 |   |   |
| Bruce, W. M.      |                 |               |                  | Chicago                       | 04 1               |                     |                      |                   | 1 |   |   |
| Buck, D. M.       |                 |               |                  |                               | 00, 13 2           |                     |                      |                   |   | 2 |   |
| Bunzell, H. H.    | Chicago         | 09            |                  | USDA                          | 12 1               |                     | 0.20                 |                   |   | 1 |   |
| Burk, W. E.       |                 |               |                  |                               | 01 1               |                     |                      |                   |   | 1 |   |
| Cadenhead, A.F.G. |                 |               |                  |                               | 14 1               |                     |                      |                   |   | 1 |   |
| Campbell, Wm.     | Columbia        | 03            | X                | Columbia                      | 02-06 4            |                     | 0.36                 | X                 |   | 4 |   |
| Carpenter, F. B.  | No              |               |                  | Industry                      | 00 1               |                     | 0.08                 |                   |   | 1 |   |

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## APPENDIX XII

(Continued)

| Name               | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment       | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|--------------------|----------|---------------|------------------|-------------------------------|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Cederholm, A. M.   |          |               |                  | MIT                           | 06, 07 2           |                     |                      |                   | 1 | 1 |   |
| Chandler, E. E.    | No       |               |                  | Chicago; Occidental           | 08 1               |                     | 0.06                 |                   | 1 |   |   |
| Chernoff, L. H.    | Yale     | 14            |                  | Yale; USDA                    | 11, 14 5           |                     | 5.00                 | X                 |   | 5 |   |
| Clarke, E. D.      |          |               |                  | Harvard                       | 09 1               |                     |                      |                   | 1 |   |   |
| Clowes, E. S.      |          |               |                  |                               | 04 1               |                     |                      |                   | 1 |   |   |
| Cohen, L. J.       | No       |               |                  | Bureau of Standards; George   | 07 2               |                     | 0.20                 |                   | 2 |   |   |
|                    |          |               |                  | Washington; National Electric |                    |                     |                      |                   |   |   |   |
|                    |          |               |                  | Sign Company                  |                    |                     |                      |                   |   |   |   |
| Cone, L. H.        | Michigan | 05            | X                | Michigan                      | 06-14 3            |                     | 0.33                 |                   | 3 |   |   |
| Cook, A. D.        |          |               |                  |                               | 98 1               |                     |                      |                   |   | 1 |   |
| Cornelison, R. W.  | Harvard  | 93            |                  | Industry                      | 08 1               |                     | 0.05                 |                   |   | 1 |   |
| Cox, M. W.         |          |               |                  | Harvard                       | 14 1               |                     |                      |                   | 1 |   |   |
| Crawford, W. G.    |          |               |                  | Wisconsin                     | 13 1               |                     |                      |                   | 1 |   |   |
| Crossman, T.       |          |               |                  |                               | 94 1               |                     |                      |                   |   | 1 |   |
| Cummer, F. W.      |          |               |                  |                               | 03 1               |                     |                      |                   | 1 |   |   |
| Dains, F. B.       | Chicago  | 98            | X                | Washburn College; Kansas      | 99-13 7            |                     | 0.44                 | X                 | 7 |   |   |
| Davenport, A. T.   |          |               |                  | Du Pont de Nemours Powder     | 10 1               |                     |                      |                   |   | 1 |   |
| Davis, L. H.       |          |               |                  | Illinois Department of Animal | 14 1               |                     |                      |                   |   | 1 |   |
|                    |          |               |                  | Husbandry                     |                    |                     |                      |                   |   |   |   |
| Dean, A. L.        | Yale     | 02            |                  | Yale; Hawaii                  | 07-14 3            |                     | 0.25                 |                   |   | 2 | 1 |
| DeLury, R. E.      | Toronto  | 07            |                  | Dominion Observatory, Ottawa  | 08 1               |                     | 0.14                 |                   | 1 |   |   |
| DeSchweintz, E. A. |          |               |                  |                               | 94-03 6            |                     |                      |                   |   | 1 | 5 |
| Dickson, W. S.     |          |               |                  | North Carolina                | 08-12 3            |                     |                      |                   | 1 | 2 |   |
| * Doan, M.         |          |               |                  |                               | 96 1               |                     |                      |                   | 1 |   |   |
| Doran, J.          |          |               |                  | Minnesota                     | 07, 12 3           |                     |                      |                   |   | 3 |   |
| Dox, A. W.         | Yale     | 09            |                  | Iowa Experimental Station     | 05-13 5            |                     | 1.00                 | X                 | 2 | 1 | 2 |

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(Continued)

| Name              | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment             | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-------------------|-----------|---------------|------------------|-------------------------------------|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Ducca, W. A.      |           |               |                  |                                     | 12                 | 1                   |                      |                   |   | 1 |   |
| Duncan, R. A.     |           |               |                  |                                     | 03                 | 1                   |                      |                   |   | 1 |   |
| Dupont, F. M.     |           |               |                  |                                     | 10                 | 1                   |                      |                   |   | 1 |   |
| Eastman, E. D.    | Berkeley  | 17            |                  | Berkeley                            | 14                 | 2                   | 2.00                 |                   | 1 | 1 |   |
| Eddy, H. P.       | No        |               |                  | Independent                         | 94                 | 1                   | 0.14                 |                   |   | 1 |   |
| Eldred, F. R.     | No        |               |                  | Eli Lilly & Company; Industry       | 06                 | 1                   | 0.08                 |                   |   | 1 |   |
| Elvove, E.        | No        |               |                  | USPH - Hygienic Laboratory          | 10                 | 1                   | 0.25                 |                   |   | 1 |   |
| Emley, W. E.      |           |               |                  |                                     | 11                 | 1                   |                      |                   |   | 1 |   |
| Erb, E. S.        |           |               |                  | Penn State                          | 02                 | 1                   |                      |                   | 1 |   |   |
| * Evans, A. C.    |           |               |                  |                                     | 11                 | 1                   |                      |                   |   | 1 |   |
| Failyer, G. H.    | No        |               |                  | USDA                                | 03                 | 1                   | 0.04                 |                   |   | 1 |   |
| Farrington, E. H. | No        |               |                  | Wisconsin                           | 96                 | 1                   | 0.04                 |                   |   | 1 |   |
| Ferguson, Wm. C.  |           |               |                  |                                     | 10                 | 1                   |                      |                   |   | 1 |   |
| Fields, J.        |           |               |                  |                                     | 96                 | 1                   |                      |                   | 1 |   |   |
| Fischer, R.       |           |               |                  |                                     | 00                 | 1                   |                      |                   | 1 |   |   |
| * Fleming, R. M.  |           |               |                  |                                     | 14                 | 1                   |                      |                   |   | 1 |   |
| Forbes, F. B.     |           |               |                  | Massachusetts State Board of Health | 03                 | 1                   |                      |                   |   |   | 1 |
| Foulk, C. W.      | No        |               | X                | OSU                                 | 96, 14             | 2                   | 0.12                 |                   | 2 |   |   |
| Fravy, F. C.      | Minnesota | 12            | X                | Minnesota; Industry                 | 06-13              | 4                   | 2.00                 | X                 | 2 | 2 |   |
| Friend, G. C.     |           |               |                  |                                     | 01                 | 1                   |                      |                   | 1 |   |   |
| Fuller, H. C.     | No        |               |                  | USDA; Industry                      | 10                 | 1                   | 0.14                 |                   |   | 1 |   |
| Gaines, R. H.     | No        |               |                  | New York Board of Water Supply      | 10, 12             | 2                   | 0.08                 |                   |   | 2 |   |
| Garner, J. B.     | Chicago   | 97            |                  | Wabash College                      | 09                 | 1                   | 0.06                 |                   | 1 |   |   |
| Geisler, J. F.    | No        |               |                  | New York Mercantile Exchange;       | 98-00              | 3                   | 0.13                 |                   |   | 3 |   |
|                   |           |               |                  | New York Department of Agriculture  |                    |                     |                      |                   |   |   |   |
| Gemberling, A.    |           |               |                  | Michigan                            | 07                 | 1                   |                      |                   | 1 |   |   |

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| Name              | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment           | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-------------------|----------|---------------|------------------|-----------------------------------|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Gibbs, H. D.      | No       |               |                  | USDA                              | 04-12              | 7                   | 0.50                 | X                 | 5 | 2 |   |
| Gillett, H. W.    | Cornell  | 10            |                  | U.S. Bureau of Mines              | 09, 11             | 2                   | 0.50                 |                   |   | 2 |   |
| Goldbaum, J. S.   | Penn     | 10            |                  | Industry (Fels & Company)         | 08-11              | 4                   | 1.00                 | X                 | 4 |   |   |
| Gorsline, E. E.   |          |               |                  | University of Illinois            | 12                 | 1                   |                      |                   | 1 |   |   |
| Gray, T. T.       | No       |               |                  | Tide Water Oil Company; Industry  | 09                 | 1                   | 0.06                 |                   |   | 1 |   |
| Griffin, C. E.    |          |               |                  |                                   | 09                 | 1                   |                      |                   |   | 1 |   |
| Grosvenor, W. M.  | Penn     | 98            |                  | Independent                       | 95                 | 1                   | 0.06                 |                   | 1 |   |   |
| Gulick, L.        |          |               |                  | Clark                             | 11                 | 1                   |                      |                   | 1 |   |   |
| * Hahn, D. A.     | No       |               |                  | Holyoke                           | 14                 | 1                   | 0.10                 |                   | 1 |   |   |
| Hall, R. D.       | Penn     | 04            |                  | Wisconsin; Westinghouse Lamp Inc. | 02-07              | 5                   | 0.71                 | X                 | 5 |   |   |
| Hamilton, L. P.   |          |               |                  |                                   | 01                 | 1                   |                      |                   | 1 |   |   |
| Hand, W. F.       | Columbia | 03            |                  | Mississippi Agricultural College  | 02-06              | 4                   | 0.36                 | X                 | 4 |   |   |
| Hare, R. F.       | No       |               |                  | New Mexico College                | 10                 | 1                   | 0.06                 |                   |   | 1 |   |
| Harris, I. F.     | No       |               |                  | Connecticut Experimental Station; | 03                 | 1                   | 0.14                 |                   |   | 1 |   |
|                   |          |               |                  | Industry                          |                    |                     |                      |                   |   |   |   |
| Hartmann, M. L.   | Harvard  | 15            |                  | South Dakota School of Mines;     | 10, 11             | 2                   | 2.00                 |                   | 1 | 1 |   |
|                   |          |               |                  | Industry                          |                    |                     |                      |                   |   |   |   |
| Haynes, E.        |          |               |                  |                                   | 10, 13             | 2                   |                      |                   |   | 2 |   |
| Henderson, Wm. E. | Hopkins  | 97            |                  | OSU                               | 13                 | 2                   | 0.12                 |                   | 2 |   |   |
| Hess, Wm. H.      |          |               |                  | Cement Company, Kansas            | 99-06              | 7                   |                      |                   |   | 7 |   |
| Hickey, C. H.     |          |               |                  | Harvard                           | 07                 | 1                   |                      |                   | 1 |   |   |
| Hill, A. E.       | Freiburg | 03            | X                | NYU                               | 07-10              | 6                   | 0.55                 | X                 | 6 |   |   |
| Hilpert, W. S.    | Chicago  | 06            |                  | American Medical Association      | 08                 | 1                   | 0.13                 |                   |   | 1 |   |
| Hinkel, F. C.     | No       |               |                  | Industry                          | 07                 | 1                   | 0.50                 |                   |   | 1 |   |
| Hoben, F. M.      |          |               |                  | New Hampshire College             | 12                 | 1                   |                      |                   | 1 |   |   |
| Holden, H. C.     |          |               |                  | New Hampshire College             | 13, 14             | 3                   |                      |                   | 3 |   |   |

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| Name             | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                             | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|------------------|----------|---------------|------------------|---|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Hoover, C. R.    | Harvard  | 15            |                  | Wesleyan  | 12 1               |                     | 1.00                 |                   | 1 |   |   |
| Hopkins, C. G.   | Cornell  | 98            | X                | Illinois Experimental Station                       | 96-03 6            |                     | 0.38                 | X                 | 2 | 4 |   |
| Horton, W. A.    |          |               |                  |   | 95, 09 2           |                     |                      |                   |   | 2 |   |
| Howard, G. M.    |          |               |                  | Battery Company, Philadelphia                       | 08 1               |                     |                      |                   |   | 1 |   |
| * Hull, M.       |          |               |                  | Northwestern Medical School                         | 14 1               |                     |                      |                   |   |   | 1 |
| Hurley, Wm. B.   |          |               |                  | Michigan  | 11 1               |                     |                      |                   | 1 |   |   |
| Hyde, H. St. J.  |          |               |                  |   | 00 1               |                     |                      |                   |   | 1 |   |
| Jackson, D. D.   | No       |               |                  | Department of Water Supply, New York City; Columbia | 01, 09 2           |                     | 0.13                 |                   |   | 2 |   |
| James, J. J.     |          |               |                  |   | 99-13 3            |                     |                      |                   | 1 | 2 |   |
| Job, R.          | No       |               |                  | Industry  | 00 1               |                     | 0.05                 |                   |   | 1 |   |
| Johnson, E.      |          |               |                  |   | 13 1               |                     |                      |                   |   | 1 |   |
| Jones, J.        |          |               |                  | William Cramp & Sons, Philadelphia                  | 93 1               |                     |                      |                   |   | 1 |   |
| Judd, R. C.      |          |               |                  | Wisconsin   | 11 1               |                     |                      |                   | 1 |   |   |
| Karslake, W. J.  | Hopkins  | 95            |                  | Iowa  | 08-14 5            |                     | 0.26                 |                   | 5 |   |   |
| Keller, E.       | Zurich   | 81            | X                | Baltimore Copper Works; Industry                    | 97-10 5            |                     | 1.00                 |                   |   | 5 |   |
| Kenny, E. G.     |          |               |                  |   | 09 1               |                     |                      |                   |   | 1 |   |
| Keyes, D. B.     | Berkeley | 17            |                  | Industry  | 14 1               |                     | 1.00                 |                   | 1 |   |   |
| Kinnicutt, L. P. | Harvard  | 82            | X                | Worcester   | 98,99 2            |                     | 0.11                 |                   |   |   | 2 |
| Knote, J. M.     |          |               |                  |   | 11 1               |                     |                      |                   |   | 1 |   |
| Koch, W.         | Harvard  | 00            |                  | Chicago   | 09 4               |                     | 0.28                 |                   |   |   | 4 |
| * Kollock, L. G. | Penn     | 99            |                  | Girls High School (Louisville); Illinois            | 99-10 5            |                     | 0.33                 |                   | 4 | 1 |   |
|                  |          |               |                  | Penn  | 14 1               |                     |                      |                   |   |   | 1 |
| Krauss, R. B.    |          |               |                  |   | 00 1               |                     |                      |                   |   |   | 1 |
| Kusel, G. C.     |          |               |                  |   | 06 2               |                     |                      |                   |   | 2 |   |
| Lampen, A.       |          |               |                  | Columbia Electrochem Laboratory                     |                    |                     |                      |                   |   |   |   |

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| Name              | Place                | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                      | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-------------------|----------------------|---------------|------------------|--|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Longdon, S. C.    | Washington (Seattle) | 15            |                  | University of Washington                     | 13, 14 2           |                     | 2.00                 |                   |   |   |   |
| Lathrop, E. C.    | American             | 16            |                  | USDA; DuPont                                 | 10-12 6            |                     | 6.00                 | X                 |   | 6 |   |
| Lee, R. E.        | NYU                  | 10            |                  | Allegheny College                            | 13 1               |                     | 0.25                 |                   | 1 |   |   |
| Lewis, W. L.      | Chicago              | 09            |                  | Northwestern                                 | 14 1               |                     | 0.20                 |                   |   | 1 |   |
| Liddle, L. M.     |                      |               |                  | Yale   | 08 2               |                     |                      |                   | 2 |   |   |
| Lindner, W. V.    |                      |               |                  |  | 12 1               |                     |                      |                   |   |   | 1 |
| Livermore, W. R.  |                      |               |                  |  | 90 1               |                     |                      |                   | 1 |   |   |
| * Logan, L.       |                      |               |                  |  | 01 1               |                     |                      |                   | 1 |   |   |
| Low, A. H.        | No                   |               |                  | Colorado School of Mines                     | 93-08 6            |                     | 0.26                 |                   |   | 6 |   |
| Lundell, G. E. F. | Cornell              | 09            |                  | Cornell                                      | 09, 14 2           |                     | 0.40                 |                   | 1 | 1 |   |
| Lyon, L.          |                      |               |                  |  | 11, 13 2           |                     |                      |                   |   | 2 |   |
| McCandle's, J. M. |                      |               |                  | Georgia Department of Agriculture            | 04-14 3            |                     |                      |                   |   | 3 |   |
| McClenahan, F. M. |                      |               |                  | Maryville                                    | 09 1               |                     | 0.10                 |                   |   |   | 1 |
| McCracken, R. F.  |                      |               |                  | Columbia                                     | 10 1               |                     |                      |                   | 1 |   |   |
| McKay, G.M.J.     | No                   |               |                  | General Electric                             | 10-14 5            |                     | 1.66                 |                   | 5 |   |   |
| McNeil, H. C.     | George Washington    | 05            |                  | USDA; Bureau of Standards; George Washington | 06 1               |                     | 0.11                 |                   | 1 |   |   |
| MacFarlane, W.    | Illinois             | 15            |                  | Utah College                                 | 10 1               |                     | 1.00                 |                   |   | 1 |   |
| Maas, P.          |                      |               |                  |  | 93 1               |                     |                      |                   | 1 |   |   |
| Mallinckrodt, E.  | No                   |               |                  | Mallinckrodt Chemical Works                  | 05 2               |                     | 0.25                 |                   |   | 1 | 1 |
| Marsh, C. E.      |                      |               |                  |  | 10, 11 2           |                     |                      |                   |   | 2 |   |
| Mason, F. H.      |                      |               |                  |  | 93 1               |                     |                      |                   |   |   |   |
| Mathewson, W. E.  |                      |               |                  | Kansas State Agricultural College            | 06-13 4            |                     |                      |                   |   | 4 |   |
| Meloche, C. C.    |                      |               |                  | University of Wisconsin                      | 13 1               |                     |                      |                   |   | 1 |   |
| Merz, A. R.       | No                   |               |                  | USDA   | 13, 14 2           |                     | 2.00                 |                   |   | 2 |   |

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| Name             | Place          | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                                       | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|------------------|----------------|---------------|------------------|---|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Miller, C. F.    | Cornell        | 14            |                  | Cornell; North Carolina College                               | 14                 | 1                   | 1.00                 |                   |   | 1 |   |
| Mills, J. E.     | North Carolina | 01            |                  | University of North Carolina;<br>University of South Carolina | 09,10              | 2                   | 0.15                 |                   | 2 |   |   |
| Mixer, C. J.     |                |               |                  |   | 95-97              | 3                   |                      |                   |   | 3 |   |
| Moore, R. L.     |                |               |                  | Wesleyan  | 12                 | 2                   |                      |                   | 2 |   |   |
| * Morgan, A. F.  | Chicago        | 14            |                  | California  | 11                 | 1                   | 1.00                 |                   | 1 |   |   |
| Morrison, J. L.  |                |               |                  |   | 99                 | 1                   |                      |                   |   | 1 |   |
| Moulton, C. R.   | Missouri       | 11            |                  | Missouri  | 09,14              | 2                   | 0.67                 |                   |   | 2 |   |
| Mulliken, S. P.  | Leipzig        | 90            | X                | MIT   | 10                 | 1                   | 0.04                 |                   | 1 |   |   |
| Myers, R. E.     | Penn           | 04            |                  | Westinghouse Lamp Company                                     | 04                 | 1                   | 0.10                 |                   |   | 1 |   |
| Nelson, B. E.    |                |               |                  | New York State Hospitals                                      | 14                 | 1                   |                      |                   |   | 1 |   |
| Newman, H. E.    |                |               |                  |   | 97                 | 1                   |                      |                   | 1 |   |   |
| Mikaido, Y.      |                |               |                  |   | 02,03              | 2                   |                      |                   |   | 2 |   |
| Norton, J. H.    |                |               |                  | Arkansas Agricultural Experimental<br>Station                 | 08                 | 1                   |                      |                   |   | 1 |   |
| Oberfell, G. G.  |                |               |                  |   | 14                 | 1                   |                      |                   |   | 1 |   |
| O'Neill, E.      | No             |               | X                | Berkeley  | 03                 | 1                   | 0.04                 |                   |   | 1 |   |
| Owen, F. T.      | Columbia       | 12            |                  | Emporia   | 07,11              | 2                   | 2.00                 |                   | 2 |   |   |
| Pammel, E. E.    |                |               |                  |   | 96                 | 1                   |                      |                   |   |   | 1 |
| Parks, N.        |                |               |                  | Case School of Applied Science                                | 98                 | 1                   |                      |                   |   | 1 |   |
| Patterson, G. W. | No             |               |                  | Naval Proving Ground, Maryland                                | 12                 | 1                   | 0.06                 |                   |   | 1 |   |
| Pellet, H.       |                |               |                  |   | 94                 | 1                   |                      |                   |   | 1 |   |
| Perkins, C. L.   |                |               |                  |   | 10                 | 1                   |                      |                   | 1 |   |   |
| Peterson, W. H.  | Wisconsin      | 13            | X                | Wisconsin   | 11,14              | 2                   | 1.00                 |                   |   | 2 |   |
| Pierle, C. A.    |                |               |                  | Lehigh  | 12                 | 1                   |                      |                   | 1 |   |   |
| Plummer, G. W.   | Penn           | 10            |                  | Penn; Germantown High School                                  | 11                 | 1                   | 0.25                 |                   | 1 |   |   |

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| Name              | Place    | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-------------------|----------|---------------|------------------|--|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Porter, F. B.     | No       |               |                  | Industry; Ft. Worth Laboratory   | 09,12              | 2                   | 0.40                 |                   |   | 2 |   |
| Prager, W. L.     | Clark    | 08            |                  | CCNY   | 08                 | 1                   | 0.16                 |                   | 1 |   |   |
| Pritz, W. B.      |          |               |                  | OSU  | 13                 | 1                   |                      |                   | 1 |   |   |
| Rafsky, H. R.     |          |               |                  | Harvard  | 10,12              | 2                   |                      |                   | 1 | 1 |   |
| Rather, J. B.     | No       |               |                  | Texas-Agricultural Station   | 10-14              | 5                   | 5.00                 | X                 |   | 4 | 1 |
| Reed, H. S.       | Missouri | 07            | X                | Virginia Experimental Station;<br>Citrus Experimental Station,<br>California | 07                 | 1                   | 0.14                 |                   |   | 1 |   |
| Reifsnyder, S. K. |          |               |                  |  | 93                 | 1                   |                      |                   |   | 1 |   |
| Richards, E. H.   |          |               |                  | MIT  | 93,96              | 2                   |                      |                   |   |   | 2 |
| Riegel, E. R.     |          |               |                  | Harvard  | 12                 | 1                   |                      |                   | 1 |   |   |
| Ritchey, J. C.    |          |               |                  |  | 02                 | 1                   |                      |                   |   | 1 |   |
| Robinson, F. C.   | No       |               |                  | Bowdoin  | 94                 | 1                   | 0.05                 |                   | 1 |   |   |
| Rogers, A.        | Penn     | 02            |                  | Pratt Institute, New York  |                    | 5                   | 0.42                 | X                 | 4 | 1 |   |
| Ross, S. H.       |          |               |                  | USDA; Nebraska   | 13                 | 1                   |                      |                   |   | 1 |   |
| Ruder, W. E.      |          |               |                  | GE   | 12,13              | 2                   |                      |                   |   | 2 |   |
| Ruppel, H.E.K.    |          |               |                  |  | 09                 | 1                   |                      |                   | 1 |   |   |
| Sage, M. W.       |          |               |                  | MIT  | 08                 | 1                   |                      |                   | 1 |   |   |
| Sandman, E. A.    |          |               |                  |  | 13,14              | 2                   |                      |                   |   | 2 |   |
| Sauer, E.         |          |               |                  |  | 94,95              | 2                   |                      |                   |   | 2 |   |
| Schaffer, H. A.   |          |               |                  |  | 96                 | 1                   |                      |                   | 1 |   |   |
| Schlesinger, M.D. |          |               |                  | Columbia   |                    | 5                   |                      |                   |   |   | 5 |
| Scholes, E. R.    | Yale     | 11            |                  | Industry (H. C. Fry Glass Company)   |                    | 4                   | 1.00                 | X                 | 2 | 2 |   |
| Schreiber, H.     |          |               |                  | USDA   | 07,10              | 2                   |                      |                   |   | 2 |   |
| deSchweintz       |          |               |                  |  |                    |                     |                      |                   |   |   |   |
| Schweitzer, H.    | Freiburg | 84            | X                | Industry   | 93,94              | 2                   | 0.08                 |                   |   | 2 |   |

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| Name            | Place     | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-----------------|-----------|---------------|------------------|--|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Seibert, F. M.  | Princeton | 17            |                  | Industry   | 13, 14             | 2                   | 2.00                 |                   | 1 | 1 |   |
| Shaw, R. H.     | No        |               | X                | USDA   | 06                 | 1                   | 0.11                 |                   |   | 1 |   |
| Sheppard, E. J. |           |               |                  |  | 12                 | 1                   |                      |                   |   | 1 |   |
| Shimer, P. W.   | No        |               |                  | Independent  |                    | 7                   | 0.30                 |                   | 1 | 6 |   |
| Shock, H. L.    |           |               |                  |  | 97                 | 1                   |                      |                   |   | 1 |   |
| Silverman, M.   |           |               |                  |  | 02                 | 1                   |                      |                   |   | 1 |   |
| Skinner, J. J.  | American  | 17            |                  | USDA   | 12                 | 1                   | 1.00                 |                   |   | 1 |   |
| Smeaton, W. G.  |           |               |                  | University of Michigan   | 06                 | 1                   |                      |                   | 1 |   |   |
| Smith, E. L.    |           |               |                  |  | 96                 | 1                   |                      |                   | 1 |   |   |
| Smith, O. C.    |           |               |                  |  | 13                 | 1                   |                      |                   |   | 1 |   |
| Snell, J. F.    | Cornell   | 98            |                  | MacDonald College, Canada  |                    | 7                   | 0.44                 | X                 | 1 | 6 |   |
| Sosman, R. B.   | MIT       | 07            |                  | Carnegie Institution   | 12                 | 1                   | 0.14                 |                   |   | 1 |   |
| Sperry, E. A.   | No        |               |                  | Industry   | 09                 | 1                   | 0.04                 |                   |   | 1 |   |
| Starke, F. W.   |           |               |                  |  | 97                 | 1                   |                      |                   |   | 1 |   |
| Stem, F. B.     |           |               |                  |  | 09                 | 1                   |                      |                   |   | 1 |   |
| Stilwell, A. G. | No        |               |                  | Stilwell Laboratory  | 06                 | 1                   | 0.10                 |                   |   | 1 |   |
| Storm, C. G.    | No        |               |                  | Navy Powder Works; U.S. Bureau<br>of Mines                                     | 09                 | 1                   | 0.11                 |                   |   | 1 |   |
| Sullivan, E. C. | Leipzig   | 99            | X                | Corning Glass Works  | 05, 14             | 3                   | 0.20                 |                   | 2 | 1 |   |
| Suzukii, S.     |           |               |                  | Wisconsin  | 09                 | 1                   |                      |                   |   | 1 |   |
| Taggart, W. G.  |           |               |                  |  |                    | 4                   |                      |                   | 2 | 2 |   |
| Taylor, C.      | No        |               |                  | Bureau of Mines  | 10                 | 2                   | 2.00                 |                   |   | 2 |   |
| Teller, G. L.   | No        |               |                  | Arkansas Agricultural Experimental<br>Station; Columbus Laboratory,<br>Chicago | 09, 11             | 2                   | 0.09                 |                   |   | 2 |   |
| Thomas, W. S.   | No        |               |                  | Washington (St. Louis)   | 95                 | 1                   | 0.50                 |                   |   | 1 |   |

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| Name              | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Articles<br>Year # | Listed<br>1879-1891 | Productivity<br>Rate | High<br>Producers | P | A | M |
|-------------------|------------|---------------|------------------|--|--------------------|---------------------|----------------------|-------------------|---|---|---|
| Thorburn, A. D.   | No         |               |                  | Pitman Moore Company   | 11                 | 1                   | 0.07                 |                   |   | 1 |   |
| Tilley, C. S.     |            |               |                  | Harvard  | 09                 | 1                   |                      |                   | 1 |   |   |
| Tousley, N. E.    |            |               |                  | University of Michigan   | 04                 | 1                   |                      |                   | 1 |   |   |
| Trowbridge, P. F. | No         |               |                  | Missouri Experimental Station;<br>Missouri                                     |                    | 7                   | 0.33                 |                   | 2 | 4 | 1 |
| Tuttle, J. B.     | No         |               |                  | Bureau of Standards  |                    | 3                   | 0.75                 | X                 |   | 3 |   |
| Vail, C. E.       |            |               |                  |  | 09                 | 1                   |                      |                   |   | 1 |   |
| Verson, E.        |            |               |                  |  | 94                 | 1                   |                      |                   |   | 1 | 1 |
| Volckening, G. J. |            |               |                  |  | 97                 | 1                   |                      |                   |   | 1 |   |
| Waddell, J.       | Heidelberg | 84            | X                | Queen's University, Canada   | 11                 | 1                   | 0.04                 |                   |   | 1 |   |
| Walden, P. T.     | Yale       | 96            | X                | Yale   | 08, 11             | 2                   | 0.12                 |                   | 2 |   |   |
| Waller, E.        | Columbia   | 75            |                  | Columbia; New York Health<br>Department  | 94                 | 1                   | 0.04                 |                   | 1 |   |   |
| Warren, R. D.     |            |               |                  | Harvard  | 11                 | 1                   |                      |                   | 1 |   |   |
| Watts, O. P.      | Wisconsin  | 05            |                  | Wisconsin  | 06                 | 1                   | 0.11                 |                   |   | 1 |   |
| Weichmann, F. G.  |            |               |                  |  | 03                 | 1                   |                      |                   |   |   |   |
| Weiss, H. F.      |            |               |                  |  | 13                 | 1                   |                      |                   |   | 1 |   |
| Welsh, T.W.B.     |            |               |                  | Cornell  | 11                 | 1                   |                      |                   | 1 |   |   |
| West, F.          |            |               |                  |  | 12                 | 1                   |                      |                   |   | 1 |   |
| White, C. H.      | No         |               |                  | Harvard  | 12                 | 1                   | 0.05                 |                   | 1 |   |   |
| Whitney, J. B.    | No         |               |                  | Industry   | 06                 | 1                   | 0.25                 |                   |   | 1 |   |
| Willard, H. H.    | Harvard    | 09            |                  | University of Michigan   | 10, 12             | 2                   | 0.40                 |                   | 2 |   |   |
| Williams, J.      |            |               |                  |  | 97                 | 1                   |                      |                   |   | 1 |   |
| Wilsnack, G. G.   |            |               |                  |  | 12                 | 1                   |                      |                   |   | 1 |   |
| Withers, W. A.    | No         |               |                  | North Carolina Agricultural<br>Experimental Station; North<br>Carolina College | 01, 11             | 2                   | 0.08                 |                   |   | 2 |   |

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| <u>Name</u>     | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u> | <u>Articles</u><br><u>Year</u> <u>#</u> | <u>Listed</u><br><u>1879-1891</u> | <u>Productivity</u><br><u>Rate</u> | <u>High</u><br><u>Producers</u> | <u>P</u> | <u>A</u> | <u>M</u> |
|-----------------|--------------|-----------------------------|--------------------------------|---------------------------------------|---|-----------------------------------|------------------------------------|---------------------------------|----------|----------|----------|
| Woo, K. J.      |              |                             |                                | Wisconsin                             | 13                                      | 1                                 |                                    |                                 |          |          | 1        |
| Woodward, H. E. | Columbia     | 12                          |                                | USDA                                  | 13                                      | 1                                 | 0.50                               |                                 | 1        |          |          |
| Wright, R. G.   | Basel        | 02                          | X                              | Rutgers                               | 05                                      | 1                                 | 0.08                               |                                 | 1        |          |          |
| Youtz, L. A.    | Columbia     | 02                          |                                | Lawrence                              | 08                                      | 1                                 | 0.08                               |                                 | 1        |          |          |

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## APPENDIX XIII

## OFFICERS OF THE AMERICAN PHYSICAL SOCIETY

1899 - 1915

| <u>Name</u>       | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>     | <u>Productivity</u><br><u>Appendix</u> | <u>Productivity</u><br><u>Rate</u> |
|-------------------|--------------|-----------------------------|--------------------------------|---|--|------------------------------------|
| Ames, J. S.       | Hopkins      | 90                          | X                              | Hopkins                                   | Not Listed                             |                                    |
| Barnes, H. T.     | McGill       | 00                          |                                | McGill                                    | IV                                     | 0.33*                              |
| Barus, C.         | Wurzburg     | 79                          | X                              | USGS; Brown                               | I; III                                 | 1.50*                              |
| Brace, D. B.      | Berlin       | 85                          | X                              | Nebraska                                  | IV                                     | 0.27                               |
| Bumstead, H. A.   | Yale         | 97                          |                                | Yale                                      | Not Listed                             |                                    |
| Burgess, G. K.    | Paris        | 01                          | X                              | Bureau of Standards                       | IV                                     | 0.28                               |
| Carhart, H. S.    | No           |                             | X                              | Northwestern                              | II; IV                                 | 0.26*                              |
| Cole, A. D.       | No           |                             | X                              | OSU                                       | IV                                     | 0.19                               |
| Crew, H.          | Hopkins      | 87                          |                                | Haverford                                 | II                                     | 0.33                               |
| Franklin, W. S.   | Cornell      | 01                          |                                | Lehigh                                    | II; III                                | 0.75                               |
| Guthe, K. E.      | Marbury      | 92                          | X                              | Iowa; Michigan                            | III                                    | 0.35                               |
| Hall, E. H.       | Hopkins      | 80                          |                                | Harvard                                   | I; III                                 | 0.31*                              |
| Hallock, W.       | Wurzburg     | 81                          | X                              | USGS                                      | II                                     | 0.33                               |
| Hastings, C. S.   | Yale         | 73                          |                                | Yale                                      | I                                      | 0.35                               |
| Humphreys, W. J.  | Hopkins      | 97                          |                                | U.S. Weather Bureau                       | IV                                     | 0.33                               |
| Kimball, A. L.    | Hopkins      | 84                          |                                | Worcester Institute of Industrial Science | II                                     | 0.44**                             |
| Lewis, E. P.      | Hopkins      | 95                          | X                              | Berkeley                                  | IV                                     | 0.05                               |
| Lyman, T.         | Harvard      | 00                          |                                | Harvard                                   |  | 0.13                               |
| Magie, W. F.      | Berlin       | 85                          | X                              | Princeton                                 | II; III                                | 0.30                               |
| McLennan, J. C.   | Toronto      | 00                          | X                              | Toronto                                   | IV                                     | 0.18                               |
| Mendenhall, C. E. | Hopkins      | 98                          |                                | Wisconsin                                 | IV                                     | 0.29                               |
| Merritt, E.       | No           |                             | X                              | Cornell                                   | II; III                                | 1.36                               |

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## APPENDIX XIII

(Continued)

| Name             | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment      | Productivity<br>Appendix | Productivity<br>Rate |
|------------------|------------|---------------|------------------|------------------------------|--------------------------|----------------------|
| Michelson, A. A. | No         |               | X                | Case                         | I                        | 0.46                 |
| Miller, D. C.    | Princeton  | 90            |                  | Case                         | Not Listed               |                      |
| Millikan, R. A.  | Columbia   | 95            | X                | Chicago                      | IV                       | 0.25                 |
| Nichols, E. F.   | Cornell    | 97            |                  | Colgate; Dartmouth; Columbia | III                      | 0.56                 |
| Nichols, E. L.   | Goettingen | 79            | X                | Kansas; Cornell              | I; III                   | 1.44                 |
| Nipher, F. E.    | No         |               |                  | Washington University        | I                        | 0.68                 |
| Pierce, B. O.    | Leipzig    | 79            | X                | Harvard                      | II                       | 0.14                 |
| Pupin, M. I.     | Berlin     | 89            | X                | Columbia                     | II                       | 1.25                 |
| Rosa, E. B.      | Hopkins    | 91            |                  | Bureau of Standards          | II; IV                   | 0.20                 |
| Rowland, H. A.   | No         |               | X                | Hopkins                      | I                        | 0.94                 |
| Sabine, W. C.    | No         |               |                  | Harvard                      | II                       | Low                  |
| Skinner, C. A.   | Berlin     | 99            | X                | Nebraska                     | IV                       | 0.26                 |
| Stewart, G. W.   | Cornell    | 01            |                  | North Dakota; Iowa           | III                      | 0.79                 |
| Stratton, S. W.  | No         |               |                  | Bureau of Standards          | Not Listed               |                      |
| Thomson, E.      | No         |               |                  | Thomson-Houston; G. E.       | Not Listed               |                      |
| Trowbridge, A.   | Berlin     | 97            | X                | Princeton                    | III                      | 0.39                 |
| Webster, A. G.   | Berlin     | 90            | X                | Clark                        |                          | 0.10                 |
| Zeleny, J.       | Minnesota  | 06            | X                | Minnesota                    | III                      | 1.61                 |

\* Means the Productivity Rate is the average for two periods.

\*\* Means High Producer.

Source: Bulletin of the American Physical Society, Series 2, 7 (April 1962), 5-9.

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## APPENDIX XIV

## OFFICERS OF THE AMERICAN MATHEMATICAL SOCIETY

1888 - 1915

| Name              | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment  | Productivity<br>Appendix | Productivity<br>Rate | Chicago<br>Section Officer |
|-------------------|------------|---------------|------------------|--------------------------|--------------------------|----------------------|----------------------------|
| Allardice, R. E.  | No         |               |                  | Stanford                 | VIII                     | 0.16                 |                            |
| Baker, A.         | Lafayette  | 89            |                  | Brooklyn High School     | VIII                     | 0.08                 |                            |
| Beman, W. W.      | No         |               |                  | Michigan                 | Not Listed               |                      |                            |
| Blichfeldt, H. E. | Leipzig    | 98            | X                | Stanford                 | VII                      | 0.94                 |                            |
| Bliss, G. A.      | Chicago    | 00            | X                | Chicago                  | VII                      | 1.07                 |                            |
| Bocher, M.        | Goettingen | 91            | X                | Harvard                  | VII                      | 1.21                 |                            |
| Bolza, O.         | Goettingen | 86            | X                | Chicago                  | VI; VII                  | 0.52*                |                            |
| Bouton, C. L.     | Leipzig    | 98            | X                | Harvard                  | VIII                     | 0.29                 |                            |
| Brown, E. W.      | Cambridge  | 97            | X                | Haverford; Yale          | VII                      | 0.55                 |                            |
| Cajori, F.        | Tulane     | 94            | X                | Colorado College         | VIII                     | 0.14                 |                            |
| Coble, A. B.      | Hopkins    | 02            |                  | Hopkins                  | VII                      | 0.77                 |                            |
| Cole, F. N.       | Harvard    | 86            | X                | Michigan                 | V; VIII                  | 0.38*                |                            |
| Coolidge, J. L.   | Bonn       | 04            | X                | Harvard                  | VII                      | 1.00                 |                            |
| Craig, T.         | Hopkins    | 78            |                  | Hopkins                  | V; VIII                  | 1.00*                |                            |
| Curtiss, D. R.    | Harvard    | 03            | X                | Northwestern             | VIII                     | 0.42                 | X                          |
| Davis, E. W.      | Hopkins    | 84            |                  | Nebraska                 | VI; VIII                 | 0.48*                |                            |
| Dickson, L. E.    | Chicago    | 96            | X                | Berkeley; Texas; Chicago | VII                      | 3.68                 | X                          |
| Eisenhart, L. P.  | Hopkins    | 00            |                  | Princeton                | VII                      | 0.87                 |                            |
| Ferry, F. C.      | Clark      | 98            |                  | Williams                 | VIII                     | 0.12                 |                            |
| Fields, J. C.     | Hopkins    | 87            | X                | Toronto                  | V; VIII                  | 0.36*                |                            |
| Fine, H. B.       | Leipzig    | 85            | X                | Princeton                | VI; VIII                 | 0.13*                |                            |
| Fiske, T. S.      | Columbia   | 88            |                  | Columbia                 | VIII                     | 0.08                 |                            |

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## APPENDIX XIV

(Continued)

| Name              | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment     | Productivity<br>Appendix | Productivity<br>Rate | Chicago<br>Section Officer |
|-------------------|------------|---------------|------------------|-----------------------------|--------------------------|----------------------|----------------------------|
| Ford, W. B.       | Harvard    | 05            |                  | Michigan                    | VIII                     | 0.50**               |                            |
| Harkness, J.      | No         |               | X                | Bryn Mawr; McGill           | Not Listed               |                      |                            |
| Haskell, M. W.    | Goettingen | 89            | X                | Berkeley                    | VIII                     | 0.40                 |                            |
| Haskins, C. N.    | Harvard    | 01            | X                | MIT; Cornell                | Not Listed               |                      |                            |
| Hoskins, L. M.    | No         |               |                  | Stanford                    | VIII                     | 0.08                 |                            |
| Hedrick, E. R.    | Goettingen | 01            | X                | Missouri                    | VII                      | 0.57                 | X                          |
| Hill, G. W.       | No         |               |                  | Columbia                    | V; VIII                  | 0.56*                |                            |
| Holgate, T. F.    | Clark      | 93            |                  | Northwestern                | VIII                     | 0.14                 |                            |
| Huntington, E. V. | Strasburg  | 01            | X                | Harvard                     | VII                      | 0.76                 |                            |
| Hutchinson, J. I. | Chicago    | 96            |                  | Cornell                     | VII                      | 0.47                 |                            |
| Hyde, E. W.       | No         |               |                  | Cincinnati                  | VI                       | 0.16                 |                            |
| Johnson, W. W.    | No         |               |                  | Annapolis                   | V; VIII                  | 0.56*                |                            |
| Kasner, E.        | Columbia   | 97            | X                | Columbia                    | VII                      | 1.00                 |                            |
| Kellogg, O. D.    | Goettingen | 02            | X                | Princeton; Missouri         | VIII                     | 0.31                 |                            |
| Keyser, C. J.     | Columbia   | 02            |                  | Columbia                    | VIII                     | 0.15                 |                            |
| Ladue, P.         | No         |               |                  | NYU                         | Not Listed               |                      |                            |
| Lovett, E. O.     | Leipzig    | 96            | X                | Princeton                   | VII                      | 0.74                 |                            |
| MacLaurin, R. C.  | No         |               | X                | Columbia                    | Not Listed               |                      |                            |
| Maschke, H.       | Goettingen | 80            | X                | Chicago                     | Not Listed               |                      |                            |
| Mason, M.         | Goettingen | 03            | X                | Yale; Wisconsin             | VIII                     | 0.58                 |                            |
| McClintock, E.    | No         |               | X                | Life Insurance              | V; VII                   | 0.56                 |                            |
| Merriman, M.      | Yale       | 76            |                  | Lehigh                      | VIII                     | 0.04                 |                            |
| Messenger, H. J.  | Cornell    | 86            | X (London)       | Travelers Insurance Company | Not Listed               |                      |                            |
| Miller, G. A.     | Cumberland | 93            | X                | Stanford; Illinois          | VII                      | 2.64                 | X                          |
| Moore, E. H.      | Yale       | 85            | X                | Chicago                     | VII                      | 0.57                 | X                          |
| Morley, F.        | No         |               | X                | Hopkins                     | Not Listed               |                      |                            |

## APPENDIX XIV

(Continued)

| Name               | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment    | Productivity<br>Appendix | Productivity<br>Rate | Chicago<br>Section Officer |
|--------------------|------------|---------------|------------------|----------------------------|--------------------------|----------------------|----------------------------|
| Moulton, F. R.     | Chicago    | 99            |                  | Chicago                    | VII                      | 0.50                 |                            |
| Murray, D. A.      | Hopkins    | 93            |                  | NYU; Cornell               | Not Listed               |                      |                            |
| Newcomb, S.        | No         |               |                  | U.S. Navy; Hopkins         |                          | 0.33                 |                            |
| Newton, H. A.      | No         |               |                  | Yale                       | Not Listed               |                      |                            |
| Olds, G. D.        | No         |               |                  | Amherst                    | Not Listed               |                      |                            |
| Oliver, J. E.      | No         |               |                  | Cornell                    | VI                       |                      |                            |
| Osgood, W. F.      | Erlangen   | 90            | X                | Harvard                    | VII                      | 0.71                 |                            |
| Peirce, B. O.      | Leipzig    | 79            | X                | Harvard                    | VIII                     | 0.08                 |                            |
| Phillips, A. W.    | Yale       | 77            |                  | Yale                       | Not Listed               |                      |                            |
| Pierpont, J.       | Vienna     | 94            | X                | Yale                       | VIII                     | 0.33                 |                            |
| Porter, M. B.      | Harvard    | 97            |                  | Texas                      | VII                      | 0.50                 |                            |
| Pupin, M. I.       | Berlin     | 89            | X                | Columbia                   | VIII                     | 0.04                 |                            |
| Rees, J. K.        | Columbia   | 95            |                  | Columbia (Observatory)     | Not Listed               |                      |                            |
| Rietz, H. L.       | Cornell    | 02            |                  | Illinois                   | VIII                     | 0.23                 |                            |
| Scott, C. A.       | London     | 85            | X                | Bryn Mawr                  | VI; VIII                 | 0.27**               |                            |
| Smith, P. F.       | Yale       | 91            | X                | Yale                       | VIII                     | 0.29                 |                            |
| Stone, O.          | No         |               |                  | Various Observatories; UVA | V; VIII                  | 0.32*                | X                          |
| Story, W. E.       | Leipzig    | 75            | X                | Clark                      | V; VIII                  | 0.30*                |                            |
| Stringham, W. I.   | Hopkins    | 80            |                  | Berkeley; Hopkins          | V; VIII                  | 0.20*                |                            |
| Taber, H.          | Hopkins    | 88            |                  | Clark                      | VI; VIII                 | 0.15*                |                            |
| Tanner, J. H.      | Goettingen | 01            | X                | Cornell                    | Not Listed               |                      |                            |
| Townsend, E. J.    | Goettingen | 00            | X                | Illinois                   | Not Listed               |                      | X                          |
| Tyler, H. W.       | Erlangen   | 89            | X                | MIT                        | Not Listed               |                      |                            |
| Van Amringe, J. H. | No         |               |                  | Columbia                   | Not Listed               |                      |                            |
| Van Vleck, E. B.   | Goettingen | 93            | X                | Wesleyan; Wisconsin        | VII                      | 0.82                 | X                          |
| Van Vleck, J. M.   | No         |               |                  | Wesleyan                   | Not Listed               |                      |                            |

## APPENDIX XIV

(Continued)

| Name              | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment    | Productivity<br>Appendix | Productivity<br>Rate | Chicago<br>Section Officer |
|-------------------|------------|---------------|------------------|----------------------------|--------------------------|----------------------|----------------------------|
| Veblen, O.        | Chicago    | 03            |                  | Princeton                  |                          | 1.08                 |                            |
| Wait, L. A.       | No         |               |                  | Cornell                    | Not Listed               |                      |                            |
| Webster, A. C.    | Berlin     | 90            | X                | Clark                      | Not Listed               |                      |                            |
| Westlund, J.      | Yale       | 98            | X                | Yale; Purdue               | Not Listed               |                      |                            |
| White, H. S.      | Goettingen | 90            | X                | Northwestern; Vassar       | VII                      | 0.50                 |                            |
| Wilczynski, E. J. | Berlin     | 97            | X                | Chicago                    | VII                      | 1.33                 | X                          |
| Wilson, E. B.     | Yale       | 01            | X                | Yale; MIT                  | VII                      | 0.86                 |                            |
| Woodward, R. S.   | No         |               |                  | USGS; Carnegie Institution | V                        | 0.45                 |                            |
| Young, J. W.      | Clark      | 92            | X                | Clark                      | VIII                     | 0.04                 |                            |
| Ziwet, A.         | No         |               | X                | Michigan                   | VI                       | 0.09                 | X                          |

## CHICAGO SECTION OFFICERS ONLY

|                  |               |    |   |                    |            |       |  |
|------------------|---------------|----|---|--------------------|------------|-------|--|
| Hall, A. G.      | Leipzig       | 02 | X | Michigan; Illinois | Not Listed |       |  |
| Holgate, T. F.   | Clark         | 93 |   | Northwestern       | VIII       | 0.14  |  |
| Myers, G. W.     | Munich        | 96 | X | Chicago            | Not Listed |       |  |
| Newsom, H. B.    | Ohio Wesleyan | 91 | X | Kansas             | VI; VIII   | 0.29* |  |
| Slaughter, H. E. | Chicago       | 98 |   | Chicago            | VIII       | 0.12  |  |
| Waldo, C. A.     | Syracuse      | 93 | X | Purdue             | Not Listed |       |  |
| Weld, L. G.      | No            |    |   | Iowa               | Not Listed |       |  |

\* Means the Productivity Rate is the average for two periods.  
 \*\* Means High Producer

Source: Raymond C. Archibald, A Semicentennial History of the American Mathematical Society, 1888-1938  
 (New York: American Mathematical Society, 1938).

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## APPENDIX XV

## OFFICERS OF THE AMERICAN CHEMICAL SOCIETY

1879 - 1891

| Name             | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                  | Productivity<br>Appendix | Productivity<br>Rate |
|------------------|------------|---------------|------------------|--|--------------------------|----------------------|
| Alsberg, M.      | No         |               | X                | Brown                                    |                          |                      |
| Appleton, J. H.  | No         |               |                  | Penn                                     | II (Ph)                  |                      |
| Barker, G. F.    | M.D.       |               |                  | Industry                                 | X                        | 0.08                 |
| Behr, A.         | Heidelberg | 69            | X                | U.S. Mint (Philadelphia)                 | IX                       | 0.44**               |
| Booth, J. C.     | No         |               |                  | Cornell                                  | IX                       | 0.83**               |
| Breneman, A. A.  | No         |               |                  | Cornell                                  | X                        | 0.08                 |
| Caldwell, G. C.  | Goettingen | 57            | X                | Columbia                                 | IX                       | 1.08**               |
| Casamajor, P.    | No         |               |                  | CCNY; Bellevue Hospital Medical          | X                        | 0.08                 |
| Chandler, C. F.  | Goettingen | 56            | X                | College                                  | IX                       | 0.50**               |
| Doremus, C. A.   | Heidelberg | 73            | X                | College Mines                            | X                        | 0.25                 |
| Elliott, A. H.   | Marburg    | 66            | X                | New York City Health Department          | IX                       | 0.58**               |
| Endemann, H.     | Goettingen | 70            | X                | CCNY                                     | IX                       | 0.92**               |
| Friedburg, L. H. | No         |               |                  | New York Mercantile Exchange; New        | Not Listed               |                      |
| Gallatin, A. H.  | No         |               |                  | York State Department of Agriculture     | IX                       | 1.66**               |
| Geisler, J. F.   | No         |               |                  |  | X                        |                      |
| Geyer, W. E.     | No         |               |                  | Stillwell & Gladding Chemical Laboratory | IX                       | 0.90**               |
| Gladding, T. S.  | No         |               |                  | Massachusetts Agricultural College       | IX                       | 0.42**               |
| Goessman, C. A.  | Goettingen | 52            | X                |  | Not Listed               |                      |
| Goldmark, J.     |            |               |                  |  | Not Listed               |                      |
| Goldschmidt, A.  |            |               |                  |  | Not Listed               |                      |
| Habirshaw, W. M. |            |               |                  |  | Not Listed               |                      |
| Hale, A. C.      | Heidelberg | 80            | X                | Brooklyn Boys' High School               | Not Listed               |                      |
| Hall, R. W.      |            |               |                  |  | Not Listed               |                      |

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## APPENDIX XV

(Continued)

| <u>Name</u>        | <u>Place</u> | <u>Ph.D.</u> | <u>Year</u> | <u>Foreign Study</u> | <u>Principal Employment</u>    | <u>Productivity Appendix</u> | <u>Productivity Rate</u> |
|--------------------|--------------|--------------|-------------|----------------------|--------------------------------|------------------------------|--------------------------|
| Hallock, A. P.     | Columbia     |              | 83          |                      | Industry                       | X                            | 0.13                     |
| Hart, E.           | Hopkins      |              | 78          |                      | Lafayette                      | X                            | 0.25                     |
| Herreshoff, J.B.F. | No           |              |             |                      | Inventor; Herreshoff Mfg. Co.  | Not Listed                   |                          |
| Hunt, T. S.        | Yes          |              |             |                      | Geological Survey, Canada; MIT | Not Listed                   |                          |
| Johnson, S. W.     | No           |              |             |                      | Yale                           | X                            | 0.25                     |
| Kent, W. H.        |              |              |             |                      |                                | Not Listed                   |                          |
| King, F. T.        |              |              |             |                      |                                | Not Listed                   |                          |
| Koenig, G. A.      |              |              |             |                      | Penn                           | X                            | 0.16                     |
| Ledoux, A. R.      |              |              |             |                      |                                | Not Listed                   |                          |
| Leeds, A. R.       | Yes          |              |             |                      | Stevens Institute              | IX                           | 4.50**                   |
| Liebschutz, M.     |              |              |             |                      |                                | X                            |                          |
| Lupton, N. T.      |              |              |             |                      |                                | X                            |                          |
| McKenna, C. F.     | Columbia     |              | 94          |                      | Industry; Independent          | Not Listed                   |                          |
| McMurtie, W.       | Lafayette    |              | 75          |                      | USDA; NY Tartar Co.            | Not Listed                   |                          |
| Mallet, J. W.      | Goettingen   |              | 52          | X                    | University of Virginia         | IX                           | 1.08**                   |
| Mason, W. P.       | No           |              |             | X                    | RPI                            | X                            | 0.20                     |
| Morton, H.         |              |              |             |                      | SIT                            | X                            | 0.25                     |
| Munroe, C. E.      | Columbia     |              | 94          |                      | U.S. Navy; George Washington   | X                            | 2.00                     |
| Munsell, C. E.     |              |              |             |                      |                                |                              |                          |
| Nason, H. B.       | Goettingen   |              | 57          | X                    | RPI                            | Not Listed                   |                          |
| Nichols, W. H.     |              |              |             |                      |                                | Not Listed                   |                          |
| O'Connor, T. D.    |              |              |             |                      |                                | Not Listed                   |                          |
| Prescott, A. B.    | M.D.         |              |             |                      | Michigan                       | X                            |                          |
| Prochazka, G. A.   |              |              |             |                      |                                | X                            |                          |
| Rau, H. M.         |              |              |             |                      |                                | X                            |                          |
| Remsen, I.         | Goettingen   |              | 70          | X                    | Hopkins                        | IX                           | 3.12                     |
| Ricketts, P. de P. | Unknown      |              |             |                      | Columbia; Independent          | X                            | 0.08                     |

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## APPENDIX XV

(Continued)

| <u>Name</u>         | <u>Place</u> | <u>Ph.D.</u> | <u>Year</u> | <u>Foreign Study</u> | <u>Principal Employment</u>                        | <u>Productivity Appendix</u> | <u>Productivity Rate</u> |
|---------------------|--------------|--------------|-------------|----------------------|--|------------------------------|--------------------------|
| Rupp, Wm.           |              |              |             |                      |  | Not Listed                   |                          |
| Sabin, A. H.        | No           |              |             |                      | Industry   | X                            | 0.09                     |
| Schweitzer, P.      | Goettingen   |              | 69          | X                    | Missouri   | Not Listed                   |                          |
| Sloane, T. O'C.     | Columbia     |              | 72          |                      | Seton Hall; Independent                            | X                            | 0.16                     |
| Squibb, E. R.       | M.D.         |              |             |                      | Squibb & Sons                                      | Not Listed                   |                          |
| Stebbins, J.H., Jr. | Omaha        |              | 93          |                      | Industry   | IX                           | 25.00**                  |
| Stilwell, C. M.     |              |              |             |                      |  | X                            |                          |
| Waldstein, M. E.    |              |              |             |                      |  | Not Listed                   |                          |
| Waller, E.          | Columbia     |              | 75          |                      | Columbia; NY Health Department                     | IX                           | 0.75**                   |
| Woodman, D.         | Stevens      |              | 87          | X                    | U.S. Electric Light Company;                       | X                            | 0.50                     |
|                     |              |              |             |                      | Consulting Chemist                                 |                              |                          |
| Wormley, T. G.      | M.D.         |              |             |                      | Capitol University; Starling Medical College; Penn | Not Listed                   |                          |

\* Means computed for two periods.

\*\* Means High Producer.

Source: "Proceedings" in Journal of the American Chemical Society.

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## APPENDIX XVI

## OFFICERS OF THE AMERICAN CHEMICAL SOCIETY

1892 - 1915

| <u>Name</u>     | <u>Place</u>   | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>                    | <u>Productivity</u><br><u>Appendix</u> | <u>Productivity</u><br><u>Rate</u> | <u>Local Councilor</u> |
|-----------------|----------------|-----------------------------|--------------------------------|--|--|------------------------------------|------------------------|
| Adamson, G. P.  | No             |                             |                                | Industry   |  |                                    |                        |
| Alden, J.       | No             |                             |                                | Industry   |  |                                    | X                      |
| Allen, E. T.    | Hopkins        | 92                          |                                | USGS   |  | 0.13                               |                        |
| Alway, F. J.    | Heidelberg     | 97                          | X                              | Nebraska; Wesleyan                                       | XI                                     | 0.47**                             |                        |
| Andrews, L. W.  | Goettingen     | 82                          | X                              | State University of Iowa;<br>Mallinckrodt Chemical Works | XI                                     | 0.52**                             |                        |
| Appleton, J. H. | No             |                             | X                              | Brown  |  |                                    |                        |
| Arbuckle, H. B. | Hopkins        | 98                          |                                | Florida State; Hopkins; Agnes Scott<br>College           | Not Listed                             | 0.06                               | X                      |
| Austen, P. T.   | Zurich         | 76                          | X                              | Rutgers; Brooklyn Polytech;<br>Independent               | IX                                     | 0.40*; **                          |                        |
| Avery, S.       | Heidelberg     | 96                          | X                              | Nebraska   | XI                                     | 0.56**                             | X                      |
| Baekeland, L.   | Ghent          | 84                          | X                              | Mfg. & Consulting Chemist;<br>Research Chemist           | Not Listed                             | 0.22                               |                        |
| Bailey, E.H.S.  | Ill. Wesleyan  | 83                          | X                              | Kansas   | Not Listed                             | 0.04                               | X                      |
| Bancroft, W. D. | Leipzig        | 92                          | X                              | Cornell  | Not Listed                             | 0.04                               |                        |
| Barker, G. F.   | M.D.           |                             |                                | Penn   | II (Physics)                           |                                    |                        |
| Barton, G. E.   | No             |                             |                                | Whitall Tatum Co.  | Not Listed                             | 0.27                               | X                      |
| Bartow, E.      | Goettingen     | 95                          | X                              | Kansas; Illinois   | Not Listed                             | 0.37                               |                        |
| Baskerville, C. | Berlin         | 93                          | X                              | North Carolina; CCNY                                     | XI                                     | 1.75**                             |                        |
| Bennett, A. A.  | North Carolina | 94                          |                                | Iowa Wesleyan; Iowa State                                | Not Listed                             | 0.09                               |                        |

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| <u>Name</u>        | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>                  | <u>Productivity</u><br><u>Appendix</u> | <u>Productivity</u><br><u>Rate</u> | <u>Local Councilor</u> |
|--------------------|--------------|-----------------------------|--------------------------------|--|--|------------------------------------|------------------------|
| Bigelow, W. D.     | No           |                             |                                | USDA; National University                              | XI                                     | 0.50**                             |                        |
| Black, H. V.       | Hopkins      |                             |                                | Georgia Tech; Georgia                                  | Not Listed                             |                                    | X                      |
| Bogert, M.         | No           |                             |                                | Columbia   | XI                                     | 4.60**                             | X                      |
| Booth, W. M.       | M.D.         |                             |                                | Minnesota; Mayo Clinic                                 | Not Listed                             | 0.33                               |                        |
| Brady, W. P.       | No           |                             |                                | Purdue Experimental Station;<br>Illinois Steel Company | Not Listed                             |                                    |                        |
| Breneman, A. A.    | No           |                             |                                | Cornell  | IX                                     | 0.31*; **                          |                        |
| Browne, A. W.      | Cornell      | 03                          |                                | Cornell  | XI                                     | 1.09**                             |                        |
| Bucher, J. E.      | Hopkins      | 94                          |                                | Brown  | Not Listed                             | 0.11                               |                        |
| Cady, H. P.        | Kansas       | 03                          |                                | Kansas   | Not Listed                             | 0.36                               |                        |
| Caldwell, G. C.    | Goettingen   | 57                          | X                              | Cornell  | X                                      | 0.04                               |                        |
| Cameron, F. K.     | Hopkins      | 94                          |                                | USDA   | XI                                     | 0.60**                             |                        |
| Campbell, E.D.     | No           |                             |                                | Michigan   | XI                                     | 1.00**                             |                        |
| Carveth, H. R.     | Cornell      | 98                          |                                | Cornell; Niagra Electrochem Co.                        | Not Listed                             |                                    | X                      |
| Catlin, C. A.      |              |                             |                                |  | Not Listed                             |                                    | X                      |
| Chamberlain, J. S. | Hopkins      | 99                          |                                | USDA; Massachusetts College                            | Not Listed                             | 0.07                               |                        |
| Chamot, E. M.      | Berlin       | 09                          | X                              |  |  |                                    |                        |
| Chandler, C. F.    | Buffalo      | 97                          | X                              | Cornell  | Not Listed                             | 0.29                               |                        |
| Clarke, F. W.      | Goettingen   | 56                          | X                              | Columbia   | X                                      | 0.08                               |                        |
| Coates, C. E.      | No           |                             |                                | USGS   | X; XII                                 | 0.23*                              |                        |
|                    | Freiberg     | 88                          | X                              | Louisiana; Audobon Sugar School                        |  | 0.17                               | X                      |
|                    | Heidelberg   | 89                          | X                              |  |  |                                    |                        |
|                    | Hopkins      | 91                          |                                |  |  |                                    |                        |
| Coblentz, V.       | Berlin       | 91                          | X                              | Columbia; E.R. Squibb & Sons                           | Not Listed                             |                                    | X                      |
|                    | Wurzburg     | 95                          | X                              |  |  |                                    |                        |
|                    | Munich       | 97                          | X                              |  |  |                                    |                        |
| Converse, W. A.    |              |                             |                                |  | Not Listed                             |                                    | X                      |

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| <u>Name</u>        | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>                         | <u>Productivity</u><br><u>Appendix</u> | <u>Productivity</u><br><u>Rate</u> | <u>Local Councilor</u> |
|--------------------|--------------|-----------------------------|--------------------------------|---|--|------------------------------------|------------------------|
| Dennis, L. M.      | No           |                             | X                              | Cornell   | XI                                     | 0.83**                             |                        |
| Dodge, F. D.       | Columbia     | 90                          | X                              | Dodge & Olcott Co. (N.J.)                                     | X                                      | 0.17*                              | X                      |
| Doremus, C. A.     | Heidelberg   | 73                          | X                              | Bellevue Hospital Medical College;<br>CCNY                    | IX                                     | 0.29*                              |                        |
| Drown, T. M.       |              |                             |                                |   | X                                      |                                    |                        |
| Dudley, C. B.      | Yale         | 74                          |                                | Penn R. R. Company  | Not Listed                             | 0.04                               |                        |
| Dudley, W. L.      | M.D.         |                             |                                | Vanderbilt  | X; XI                                  | 0.50**                             |                        |
| Emerson, W. H.     | Hopkins      | 86                          |                                | Georgia Tech  | X                                      | 0.07*                              |                        |
| Evans, T.          | Erlangen     | 86                          | X                              | Industries; Cincinnati  | Not Listed                             | 0.19                               | X                      |
| Fetterolf, D. W.   | M.D.         |                             |                                | Penn  | Not Listed                             |                                    |                        |
| Fitzgerald, F.A.J. | No           |                             | X                              | Industries; Consulting Engineer                               | Not Listed                             |                                    |                        |
| Frankforter, G. B. | Berlin       | 93                          | X                              | Minnesota   | XI                                     | 0.90**                             |                        |
| Franklin, E. C.    | Hopkins      | 94                          | X                              | Kansas; Stanford  | XI                                     | 0.45**                             |                        |
| Friedburg, L. H.   | Goettingen   | 70                          | X                              | CCNY  | IX                                     | 0.92**                             |                        |
| Geisler, J. F.     | No           |                             |                                | NY Mercantile Exchange; NY State<br>Department of Agriculture | IX; X                                  | 0.31*; **                          |                        |
| Goessman, C. A.    | Goettingen   | 52                          | X                              | Massachusetts Agricultural College                            | IX                                     | 0.42**                             |                        |
| Gornberg, M.       | Michigan     | 94                          | X                              | Michigan  | XI                                     | 1.00**                             | X                      |
| Gooch, F. A.       | Harvard      | 77                          | X                              | Yale  | IX                                     | 0.33**                             |                        |
| Gould, R. A.       | No           |                             |                                | U.S. Navy Yard; USDA  | Not Listed                             |                                    | X                      |
| Gudeman, E.        | Columbia     | 90                          | X                              | Professional Chemist; Consulting<br>Chemist                   | Not Listed                             | 0.26                               | X                      |
| Hale, A. C.        | Heidelberg   | 80                          | X                              |   | Not Listed                             |                                    |                        |
| Hall, R. W.        |              |                             |                                |   | Not Listed                             |                                    |                        |
| Hallock, A. P.     | Columbia     | 83                          |                                | Industry  | X                                      | 0.13                               |                        |
| Hart, E.           | Hopkins      | 78                          |                                | Lafayette   | X                                      | 0.23*                              |                        |

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## APPENDIX XVI

(Continued)

| <u>Name</u>        | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>  | <u>Productivity</u><br><u>Appendix</u> | <u>Productivity</u><br><u>Rate</u> | <u>Local Councilor</u> |
|--------------------|--------------|-----------------------------|--------------------------------|--|--|------------------------------------|------------------------|
| Henderson, W. E.   | Hopkins      | 97                          |                                | Ohio State   | XII                                    | 0.12                               | X                      |
| Hendrixson, W. S.  | Harvard      | 93                          |                                | Grinnell   | Not Listed                             | 0.14                               |                        |
| Herreshoff, J.B.F. | No           |                             |                                | Nichols Copper Company   | Not Listed                             |                                    | X                      |
| Herty, C. H.       | Hopkins      | 90                          |                                | Georgia; North Carolina  | XI                                     | 0.58**                             |                        |
|                    | Berlin       | 99                          | X                              |  |  |                                    |                        |
|                    | Zurich       | 00                          | X                              |  |  |                                    |                        |
| Higley, G. O.      |              |                             |                                | Michigan   | Not Listed                             |                                    |                        |
| Hillebrand, W. F.  | Heidelberg   | 75                          | X                              | USGS; Bureau of Standards  | XI                                     | 0.57**                             | X                      |
| Hulett, G. A.      | Leipzig      | 98                          | X                              | Michigan; Princeton  | Not Listed                             | 0.38                               |                        |
| Hummel, J. A.      | No           |                             |                                | Minnesota Experimental Station   | Not Listed                             | 0.09                               | X                      |
| James, J. H.       |              |                             |                                |  | Not Listed                             |                                    |                        |
| Jayne, H. W.       |              |                             |                                |  | Not Listed                             | 0.06                               | X                      |
| Johnson, F. C.     |              |                             |                                |  | Not Listed                             |                                    |                        |
| Johnson, S. W.     | No           |                             | X                              | Yale   | X                                      | 0.14                               |                        |
| Jones, L. W.       | Chicago      | 97                          | X                              | Chicago; Cincinnati  | Not Listed                             | 0.24                               |                        |
| Kahlenberg, L.     | Leipzig      | 95                          | X                              | Wisconsin  | Not Listed                             | 0.21                               |                        |
| Kinnicutt, L. P.   | Harvard      | 82                          | X                              | Worcester  | IX; XII                                | 0.30*; **                          |                        |
| Lachman, A.        | Munich       | 95                          | X                              | Oregon   | Not Listed                             | 0.16                               |                        |
| Leach, A. E.       | No           |                             |                                | Massachusetts State Board of Health  | XI                                     | 2.19**                             |                        |
| Leeds, A. R.       | Yes          |                             |                                | Stevens Institute  | IX                                     | 1.60*; **                          |                        |
| Leffman, H.        | M.D.         |                             |                                | Wagner Free Institute; Pennsylvania<br>College of Dental Surgery; Women's<br>Medical College, Pennsylvania | Not Listed                             |                                    |                        |
| Lengfeld, F.       | Hopkins      | 88                          | X                              | Chicago; Independent   | X                                      | 0.33                               |                        |
| Lenher, V.         | Penn         | 98                          |                                | Wisconsin  | XI                                     | 2.19**                             | X                      |
| Little, A. D.      | No           |                             |                                | A. D. Little, Inc.   | Not Listed                             |                                    |                        |

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| <u>Name</u>       | <u>Place</u>   | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>                         | <u>Productivity</u><br><u>Appendix</u> | <u>Productivity</u><br><u>Rate</u> | <u>Local Councillor</u> |
|-------------------|----------------|-----------------------------|--------------------------------|---|--|------------------------------------|-------------------------|
| Loeb, M.          | Berlin         | 87                          | X                              | NYU   | X                                      | 0.11                               | X                       |
| Long, J. H.       | Tubingen       | 79                          | X                              | Northwestern  | X; XI                                  | 0.94*; **                          |                         |
| Lord, R. C.       |                |                             |                                |   | Not Listed                             |                                    | X                       |
| Love, E. G.       |                |                             |                                |   | Not Listed                             |                                    |                         |
| Lyons, R. E.      | Heidelberg     | 94                          | X                              | State Department Geological and<br>Natural Resources; Indiana | Not Listed                             | 0.17                               |                         |
| McCandless, J. M. |                |                             |                                |   | Not Listed                             |                                    | X                       |
| McKenna, C. F.    | Columbia       | 94                          |                                | Industry; Consulting Chemist                                  | Not Listed                             | 0.06                               |                         |
| McMurtie, W.      | Lafayette      | 75                          |                                | NY Tartar Company; Royal Baking<br>Powder Company             | Not Listed                             |                                    |                         |
| Mabery, C.        | Harvard        | 81                          |                                | Case  | IX; XI                                 | 1.33*; **                          |                         |
| Mallet, J. W.     | Goettingen     | 52                          | X                              | Virginia  | IX                                     | 1.08**                             |                         |
| Marshall, J. A.   | Tubingen       | 82                          | X                              | Penn  | X                                      | 0.10                               | X                       |
|                   | Christiana     | 86                          |                                |   |  |                                    |                         |
| Mathews, J. A.    | Columbia       | 98                          | X                              | Industry  | Not Listed                             | 0.31                               |                         |
| Maury, G. P.      |                |                             |                                |   | Not Listed                             |                                    |                         |
| Meade, R. K.      | No             |                             |                                | Industry  | XI                                     | 1.00**                             | X                       |
| Miller, E. H.     | Columbia       | 94                          |                                | Columbia  | Not Listed                             |                                    |                         |
| Miller, W. L.     | Munich         | 90                          | X                              | Toronto   | Not Listed                             |                                    |                         |
|                   | Leipzig        | 92                          | X                              |   |  |                                    |                         |
| Mills, J. E.      | North Carolina | 01                          |                                | North Carolina; South Carolina                                | XII                                    | 0.15                               |                         |
| Moechel, J. R.    |                |                             |                                |   | Not Listed                             |                                    |                         |
| Morley, E. W.     | No             |                             |                                | Western Reserve   | IX                                     | 0.26*; **                          |                         |
| Munroe, C. E.     | No             |                             |                                | U.S. Navy; George Washington                                  | X                                      | 0.23*                              |                         |
| Newberry, W. B.   |                |                             |                                |   | Not Listed                             |                                    |                         |
| Nicholson, H. H.  | No             |                             | X                              | Nebraska  | X                                      | 0.06*                              |                         |

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| <u>Name</u>         | <u>Place</u> | <u>Ph.D.</u><br><u>Year</u> | <u>Foreign</u><br><u>Study</u> | <u>Principal</u><br><u>Employment</u>          | <u>Productivity</u><br><u>Appendix</u> | <u>Productivity</u><br><u>Rate</u> | <u>Local Councillor</u> |
|---------------------|--------------|-----------------------------|--------------------------------|--|--|------------------------------------|-------------------------|
| Norris, J. F.       | Hopkins      | 95                          |                                | Simmons  | Not Listed                             | 0.05                               |                         |
| Norton, T. H.       | Heidelberg   | 75                          | X                              | Cincinnati; U.S. Consul                        | IX; XI                                 | 0.54*; **                          |                         |
| Noyes, A. A.        | Leipzig      | 90                          | X                              | MIT  | XI                                     | 1.35**                             |                         |
| Noyes, W. A.        | Hopkins      | 82                          |                                | Terre Haute                                    | IX; XI                                 | 2.17*; **                          |                         |
|                     | Munich       | 89                          | X                              |  |  |                                    |                         |
| Parker, T. J.       |              |                             |                                |  | Not Listed                             |                                    |                         |
| Parr, S. W.         | No           |                             | X                              | Illinois                                       | X; XI                                  | 0.66*; **                          |                         |
| Parsons, C. L.      | No           |                             |                                | New Hampshire College; U.S.<br>Bureau of Mines | X; XI                                  | 0.85*; **                          |                         |
| Pennock, J. D.      | No           |                             |                                | Solvay Process Co.                             | Not Listed                             | 0.09                               | X                       |
| Perry, C. M.        |              |                             |                                |  | Not Listed                             |                                    |                         |
| Phillips, F. C.     | No           |                             |                                | Western University of Pennsylvania             | Not Listed                             | 0.26                               | X                       |
| Prescott, A. B.     | M.D.         |                             |                                | Michigan                                       | X; XI                                  | 0.67*; **                          |                         |
| Ransom, J. H.       | Chicago      | 99                          |                                | Purdue   | Not Listed                             | 0.07                               | X                       |
| Remsen, I.          | Goettingen   | 70                          | X                              | Hopkins  | IX                                     | 3.12**                             |                         |
| Richards, J. W.     | Lehigh       | 93                          | X                              | Lehigh   | Not Listed                             | 0.28                               |                         |
| Richards, T. W.     | Harvard      | 88                          | X                              | Harvard  | XI                                     | 1.43**                             |                         |
| Rising, W. B.       | Heidelberg   | 71                          | X                              | California                                     | Not Listed                             | 0.06                               |                         |
| Robbins, W. K.      | No           |                             |                                | Amoskeag Mills                                 | Not Listed                             |                                    | X                       |
| Rockwood, E. W.     | M.D.         |                             | X                              | Iowa   | Not Listed                             |                                    | X                       |
| Sabin, A. H.        | No           |                             |                                | Industry                                       | X                                      | 0.09*                              |                         |
| Sadtler, S. P.      | Goettingen   | 71                          | X                              | Penn; Philadelphia College of<br>Pharmacy      | X                                      | 0.13*                              |                         |
| Sanger, C. R.       | Harvard      | 84                          |                                | U.S. Naval Academy; Harvard                    | X                                      | 0.14                               | X                       |
| Schaffer, C. R.     |              |                             |                                |  | Not Listed                             |                                    |                         |
| Schleiffelin, W. J. | Munich       | 89                          | X                              | Schleiffelin & Co.                             | Not Listed                             | 0.04                               |                         |

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| Name                | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                                       | Productivity<br>Appendix | Productivity<br>Rate | Local Councilor |
|---------------------|------------|---------------|------------------|---|--------------------------|----------------------|-----------------|
| Schlundt, H.        | Wisconsin  | 01            | X                | Missouri  | Not Listed               |                      | X               |
| Schweitzer, H.      | Freiburg   | 84            | X                | New York City; Industry                                       | Not Listed               |                      | X               |
| Shimer, P. W.       | Lafayette  | 99            |                  | Drown Chemical Laboratory                                     | X; XII                   | 0.28*                |                 |
| Shinn, O. L.        | Penn       | 96            |                  | Penn  | Not Listed               | 0.17                 |                 |
| Smith, A.           | Munich     | 84            | X                | Chicago; Columbia   | XI                       | 0.35**               |                 |
| Smith, E. E.        | Yale       | 91            |                  | Fordham; Independent  | Not Listed               | 0.04                 |                 |
| Smith, E. F.        | Goettingen | 76            | X                | Penn  | IX; XI                   | 2.31*; **            |                 |
| Smith, W. E.        |            |               |                  |   | Not Listed               |                      |                 |
| Smith, W. R.        | Chicago    | 94            |                  | Lewis Institute, Chicago                                      | Not Listed               | 0.17                 | X               |
| Snell, J. F.        | Cornell    | 98            |                  | Cincinnati; Macdonald   | XII                      | 0.44                 |                 |
| Springer, A.        | Hadelberg  | 72            | X                | Alex Fries & Bros.  | X                        | 0.17                 |                 |
| Squibb, E. R.       | M.D.       |               |                  | E. R. Squibb & Sons   | Not Listed               | 0.63                 |                 |
| Stantial, F. G.     |            |               |                  |   | Not Listed               |                      |                 |
| Stebbins, J.H., Jr. | Omaha      | 93            |                  | Industry  | IX                       | 1.32*; **            |                 |
| Stieglitz, J.       | Berlin     | 89            | X                | Chicago   | XI                       | 0.35**               |                 |
| Stillman, J. M.     | Berkeley   | 85            | X                | Sugar Refining Companies                                      | X                        | 0.14*                |                 |
| Stokes, H. N.       | Hopkins    | 84            | X                | USGS  | X                        | 0.27*                | X               |
| Talbot, H. P.       | Leipzig    | 90            | X                | MIT   | Not Listed               | 0.22                 |                 |
| Thurnaker, G.       |            |               |                  |   | Not Listed               |                      | X               |
| Tolann, L. P.       | No         |               |                  | USDA  | XI                       | 1.18**               |                 |
| Tucker, W. G.       | Union      | 82            |                  | Albany Medical College; Albany<br>College of Pharmacy         | Not Listed               |                      | X               |
| Venable, F. P.      | Goettingen | 81            | X                | North Carolina  | IX; XI                   | 0.61*; **            |                 |
| Voorhees, S. S.     | Berlin     | 89            |                  | Pennsylvania Railroad; U.S.<br>Supervising Architects Office; | Not Listed               | 0.05                 |                 |
|                     | No         |               |                  | Bureau of Standards   |                          |                      |                 |
| Waldbott, S.        | Bern       | 89            | X                | Lloyd Bros.; Ohio Mechanical<br>Institute                     | Not Listed               | 0.09                 |                 |

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(Continued)

| Name            | Place      | Ph.D.<br>Year | Foreign<br>Study | Principal<br>Employment                                | Productivity<br>Appendix | Productivity<br>Rate | Local Councilor |
|-----------------|------------|---------------|------------------|--|--------------------------|----------------------|-----------------|
| Walker, W. H.   | Goettingen | 92            | X                | MIT  | Not Listed               | 0.32                 |                 |
| Waller, E.      | Columbia   | 75            |                  | Columbia; NY Health Department                         | IX; XII                  | 0.29*; **            |                 |
| Walters, H. E.  |            |               |                  |  | Not Listed               |                      |                 |
| Weber, H. A.    | OSU        | 79            |                  | OSU  | IX                       | 0.29*; **            |                 |
| Wells, H. L.    | No         |               |                  | Yale   | Not Listed               | 0.09                 |                 |
| Wheeler, A. S.  | Harvard    | 00            |                  | North Carolina   | Not Listed               | 0.43                 |                 |
| White, H. C.    | Berlin     | 10            | X                |  |                          |                      |                 |
|                 | Virginia   | 87            |                  | Georgia; Georgia Experimental<br>Station               | Not Listed               |                      |                 |
| Whitney, W. R.  | Leipzig    | 94            | X                | MIT; G.E.  | Not Listed               | 0.39                 |                 |
| Wiley, H. W.    | Hanover    | 76            |                  | USDA; George Washington                                | IX; XI                   | 0.80*; **            |                 |
| Williams, C. B. | No         |               |                  | North Carolina; North Carolina<br>Experimental Station | Not Listed               | 0.33                 |                 |
| Withers, W. A.  | No         |               |                  | North Carolina; North Carolina<br>Experimental Station | XII                      | 0.08                 | X               |
| Wood, E. S.     | M.D.       |               |                  | Harvard Medical School;                                | Not Listed               |                      |                 |
|                 |            |               |                  | Massachusetts General Hospital                         |                          |                      |                 |
| Woodman, D.     | Stevens    | 87            |                  | U.S. Electric Light Company;                           | X                        | 0.19                 |                 |
|                 |            |               |                  | Consulting Chemist                                     |                          |                      |                 |
| Young, S. W.    | No         |               | X                | Stanford   | XI                       | 1.00**               | X               |

\* Means computed for two periods.

\*\* Means High Producer.

Source: "Proceedings" in Journal of the American Chemical Society.